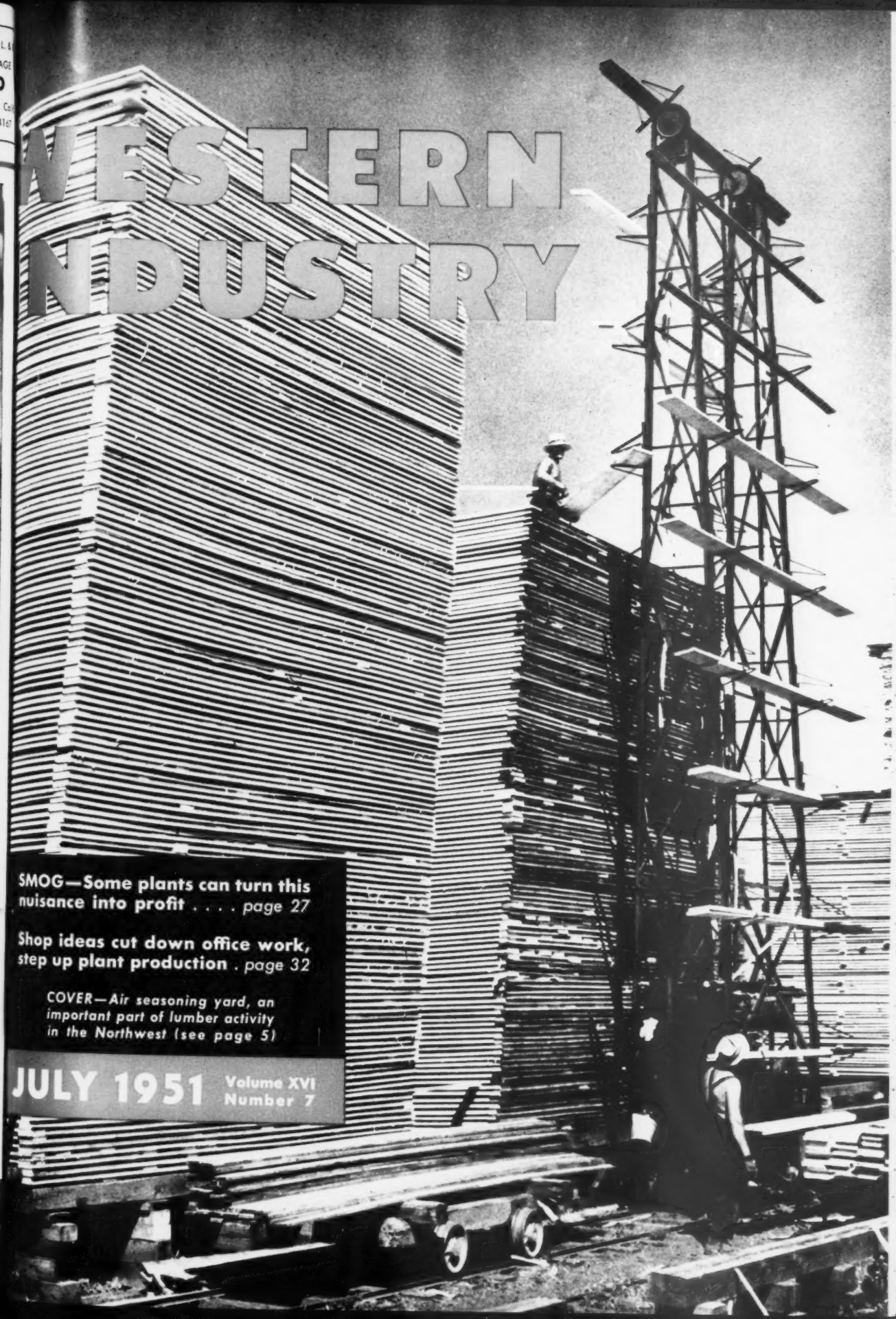
WESTERN INDUSTRY



SMOG—Some plants can turn this nuisance into profit . . . . *page 27*

Shop ideas cut down office work, step up plant production . *page 32*

COVER—Air seasoning yard, an important part of lumber activity in the Northwest (see page 5)

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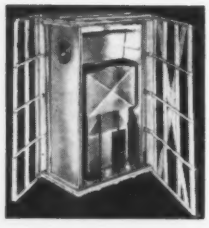

New Cabco wirebound crate for a Western furnace manufacturer weighs 55 lbs., less than half nailed crate formerly used Besides big freight savings, manufacturer finds Cabco wirebounds cost less, save assembly time, economize on warehouse space.

There's more to a CABCO container than wood, wire and price

Here a giant rotary lathe literally "peels" tough Douglas Fir veneer from steaming hot peeler logs. Soon this veneer, cut into slats, will go through an even stranger machine—the "rock-fastener stitching unit." Like a sewing machine it actually stitches Cabco wirebounds together with strong steel wire.

Special machines like these are another reason why Cabco containers are so uniformly strong, yet economical—another reason why Cabco has been the West's foremost designer and supplier of wooden shipping containers since 1883.

CABCO CONTAINERS

A product of the California Barrel Company, Ltd.

Sold only by

DUFF CALIFORNIA CO.

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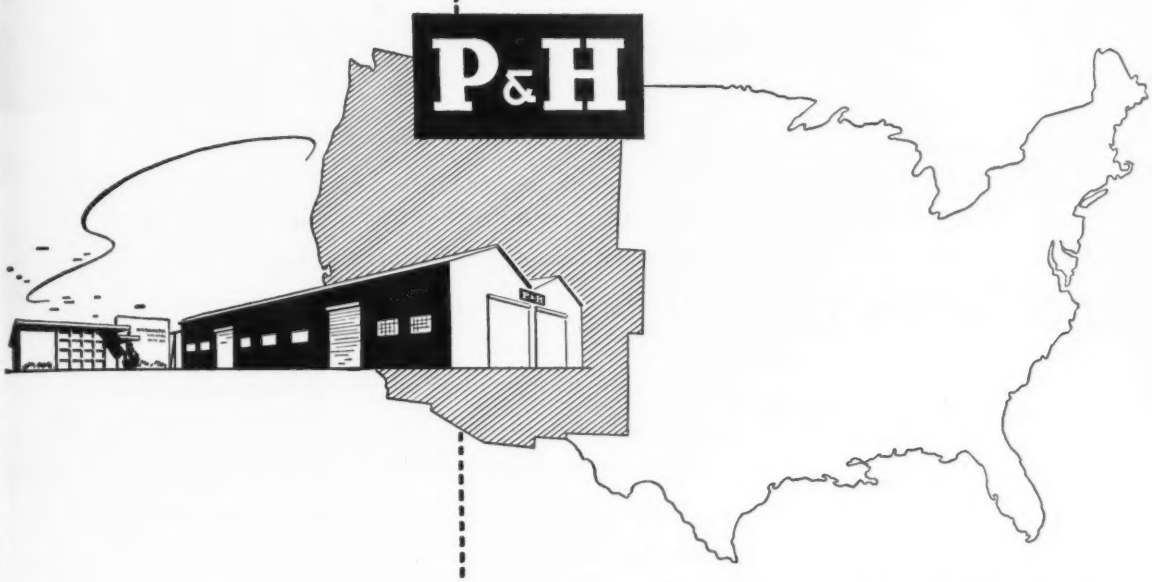
2283

Announcing

New West Coast Plant for Harnischfeger Corporation

World's Largest Builder of Overhead Cranes
Creates New Pacific Division



Now! Harnischfeger serves the West from the West!

With its new factory and offices in Los Angeles, Harnischfeger Corporation inaugurates a new era of closer cooperation and service to all western industry.

In this modern factory, Harnischfeger will build P&H Overhead Cranes, known the world over for their reliable service and added values.

To Serve 11 Western States

Here too, will be centered the fully staffed sales and service offices for all P&H products. Ample stocks of genuine P&H reserve parts will be maintained to give our customers ever better service, helping them keep their P&H equipment at peak operating efficiency at all times.

The new Pacific Division embraces the Los Angeles, San Francisco, Seattle and Denver branches.

This marks the first time any territorial division has been set up within the Harnischfeger organization. It is a direct result of the tremendous industrial growth throughout all the West . . . growth which has increased the demand for the kind of equipment that Harnischfeger produces.

P&H

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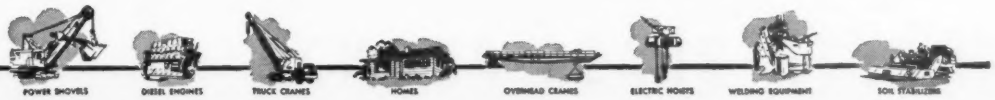
HARNISCHFEGER
CORPORATION

the P&H Line



This one is ordinary drawing brass

This one is "Formbrite"

And here's the difference

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25c per Copy $2.00 per Year

Published Monthly by
KING PUBLICATIONS
609 Mission Street
San Francisco 5, Calif.
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WESTERN INDUSTRY

VOLUME XVI JULY • 1951 NUMBER 7

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Front Cover

Lumber must be seasoned before it is shipped. This is done either in large air seasoning yards as shown on the front cover, or in dry kilns. The Hilke piler illustrated enables a man on the pile to remove boards at convenient heights as the pile builds up—often as high as 25 ft. above ground.

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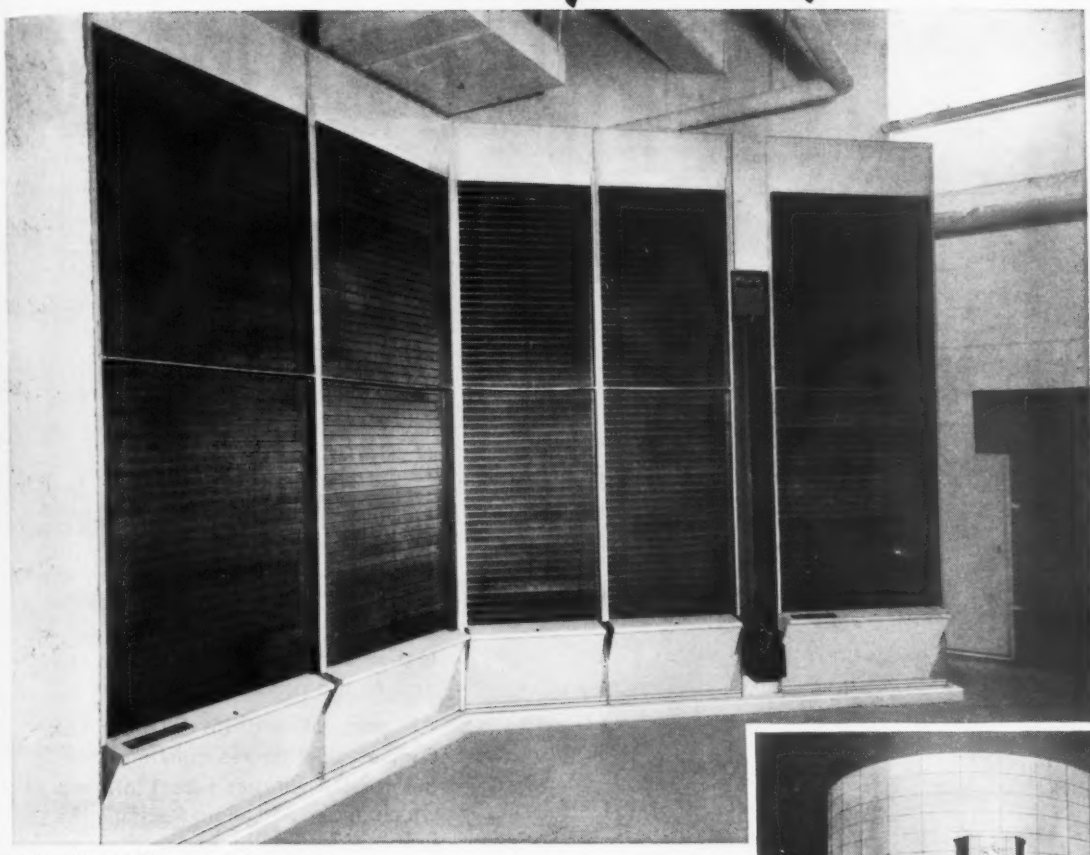

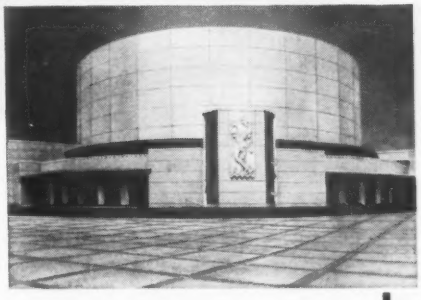

Berkley (Calif.) High School Auditorium
Architect: Henry H. Gutterson, San Francisco
Consulting Mechanical Engineer: G. M. Simonson, San Francisco
Contractor: Marelich Mfg. Co. Inc., San Bruno

AAF MULTI-DUTY

most widely used automatic air filter in the world

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The Multi-Duty automatic filter, because of its self-cleaning feature, is ideal for applications of this type where ventilating systems are not in continuous use. The filter is always in efficient operating condition without depending on the human element.

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For detailed and illustrated description of Multi-Duty write today for Engineering Bulletin No. 241-B.

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Baby - It's COLD inside!

Photo by Keystone

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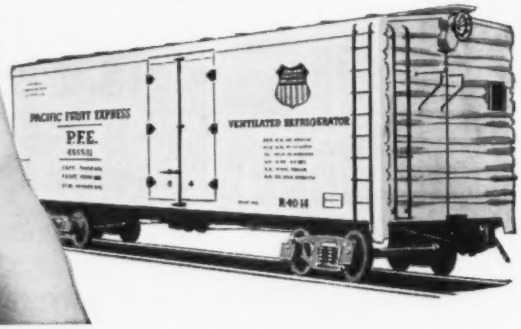

Be Specific - Ship "Union Pacific"

(Offices in 70 cities throughout the U. S. A.)

U. S. FLEX Chooses BUTLER Buildings

W127

Butler Building used as warehouse and office by Seattle branch of U. S. Flexible Metallic Tubing Co. Note specially adapted front and sidewalls.

. . . for These Outstanding Features

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- Dependable Service
- Attractive Appearance
- Complete Adaptability

"A number of oil company engineers have complimented us on the appearance of our Seattle Butler Building, and several mentioned interest in this type building for their own storage and operation facilities. All agreed that the building was entirely practical for our type industry, which is a combination of warehousing, sales and service.

"A report received from our Seattle manager states that our building went through a storm of hurricane proportions which hit the Northwest, without a leak or visible signs of other damage.

"Our Seattle members are very happy to be in the new location and our other branches are anxious to have a duplicate set-up in the respective cities."

The U. S. Flex Co.'s Seattle building was occupied just one month after foundation work was begun!

Interior view of U. S. Flex warehouse shows full usable space provided by Butler Buildings.

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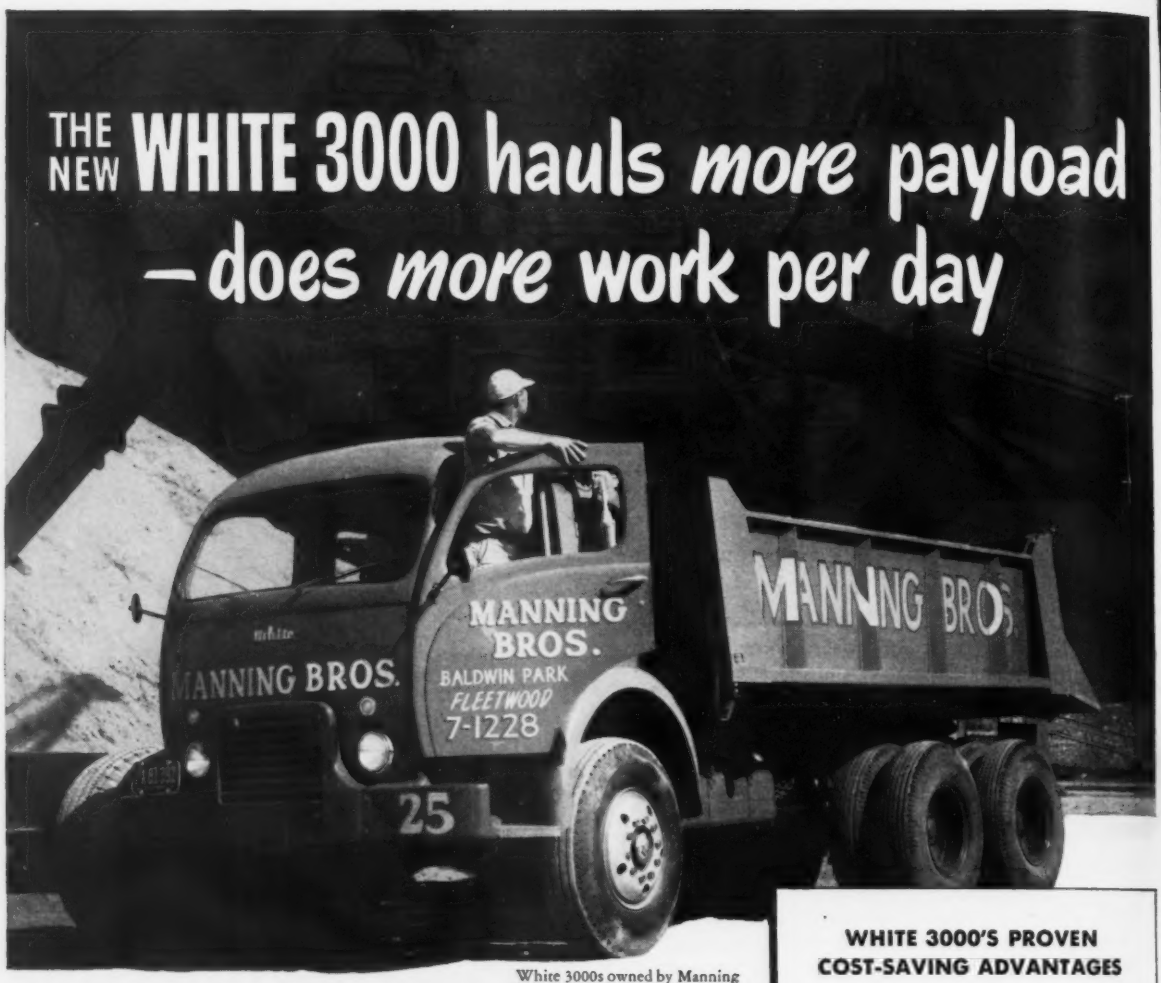
DEPT. W127, RICHMOND, CALIFORNIA

THE NEW WHITE 3000 hauls *more* payload —does *more* work per day



White 3000s owned by Manning Bros. carry greater legal payloads thanks to the new White 3000 system of weight distribution.

Get the facts of White. Discover the extra capacity and maneuverability of this completely new kind of motor truck. See how it makes more trips per day with greater economy and safety. Watch as the turn of a key tilts the cab—providing complete front-end accessibility for quick, easy maintenance. Learn how you can profit through this *new idea* in transportation. Your local White Representative is ready to prove the earning power of the sensational 3000—in terms of your own business. Call him today.

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The result: In 1951 Kaiser Steel will attain a capacity of 1,380,000 ingot tons of steel. More than *double* the amount produced in 1944—the peak war year!

More evidence that the West Coast's only integrated, *independent* steel plant is helping to build a stronger West . . . and a stronger nation!

It's good business to do business with

Kaiser Steel

built to serve the West

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"Planned lighting increased our sales tremendously"

—writes Milton N. Romey, Romey's Market, San Francisco

"More eye appeal," writes the owner of Romey's Market was the secret of a big business increase. "The only mistake we made was that we should have installed the lighting fixtures you recommended much sooner."

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Whatever your business
Good Lighting Is a Good Investment

Increases production, sales

Reduces waste

Keeps employees happy, efficient

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SPECIAL FEATURES: This control uses the famous Partlow Mercury Actuated Flexible Control Element, which can be formed to any shape to facilitate placing the mercury bulb in the most efficient position.

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3

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4

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TOUGH PROBLEMS INVITED

Ask us or your nearest BWH distributor about your power transmission belting, conveyor belting and hose problems. We're specialists in making mechanical rubber products work *better, longer.*

BWH

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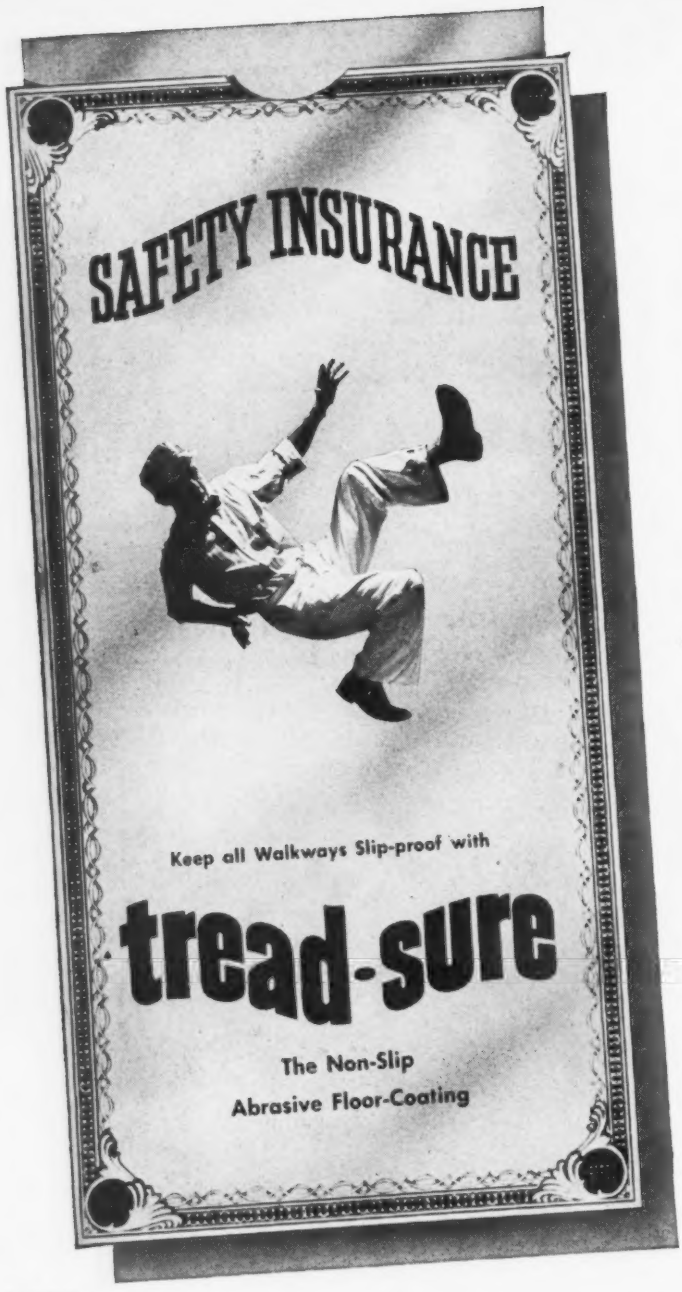

Horn Tread-Sure produces a heavy long-wearing anti-skid surface on wood, concrete or steel. Tread-Sure is an abrasive filled brush-coating, simple and inexpensive to apply on any size area.

Tread-Sure is resistant to gasoline, alcohol, oil, grease, detergents, industrial waste and many types of acids. Tread-Sure provides a non-skid safety footing, giving the worker confidence and security by reducing accident hazards.

Tread-Sure maintains traction and resiliency and is comfortable to stand on. Designed for exterior as well as interior use, it may be brush applied over other paint or direct to unpainted surfaces. Used as it comes from container. Three non-glare colors—Battleship Grey, Red, Green.

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Special Gladding, McBean & Co. Refractories Solve a Special Problem

Gladding, McBean & Co., Plastic Firebrick, which bends to fit the irregular shape of the small ladle and spout, takes the punishing heat of the molten iron and protects this important foundry equipment. Because it bends easily, (it is pounded in place with a hammer), Plastic Firebrick forms a lining that can be installed without time consuming cutting or fitting.

Plastic Firebrick is one of the many refractories Gladding, McBean & Co. makes for Western Industry. It is used in boilers, industrial furnaces, incinerators, metal processing furnaces, and other high temperature fireboxes. Plastic Firebrick is easy to shape for burner port openings, inspection doors and arches. It forms gas-tight, single-piece linings.

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Over 75 years of ceramic manufacturing experience and a real interest in your refractories' problems, makes Gladding, McBean & Co. the primary source of quality refractories for Western Industry.

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GLADDING, McBEAN & CO.

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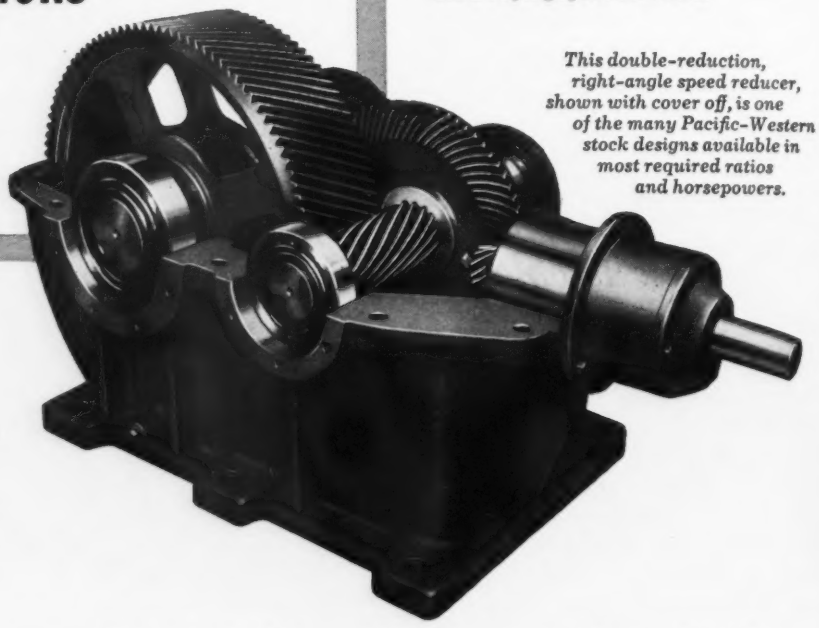
Refractories, made in the West for Western Industries. *Fireclay Brick for all classes of service, Plastic Firebrick, Castable Refractories, Silica Brick, Wet and Dry Refractory Mortars—air and heat setting, Refractory Coatings, Ground Fireclay and Grog.*

SAVE TIME BUYING SPEED REDUCERS

USE PACIFIC-WESTERN *STOCK DESIGNS*

Stock-design Pacific-Western speed reducers covering most industrial applications are available either from stock or with minimum manufacturing lead time. This fact can save you weeks in obtaining plant equipment. It also saves you money, by eliminating unneeded special tooling or engineering. Ask your nearest Pacific-Western sales engineer to show you how to save time and money when buying speed reducers.



This double-reduction, right-angle speed reducer, shown with cover off, is one of the many Pacific-Western stock designs available in most required ratios and horsepowers.

STOCK-DESIGN REDUCERS

- ★ Single, Double, and Triple Reductions
- ★ Parallel-Shaft Reducers
- ★ Right-Angle Reducers
- ★ Vertical Reducers
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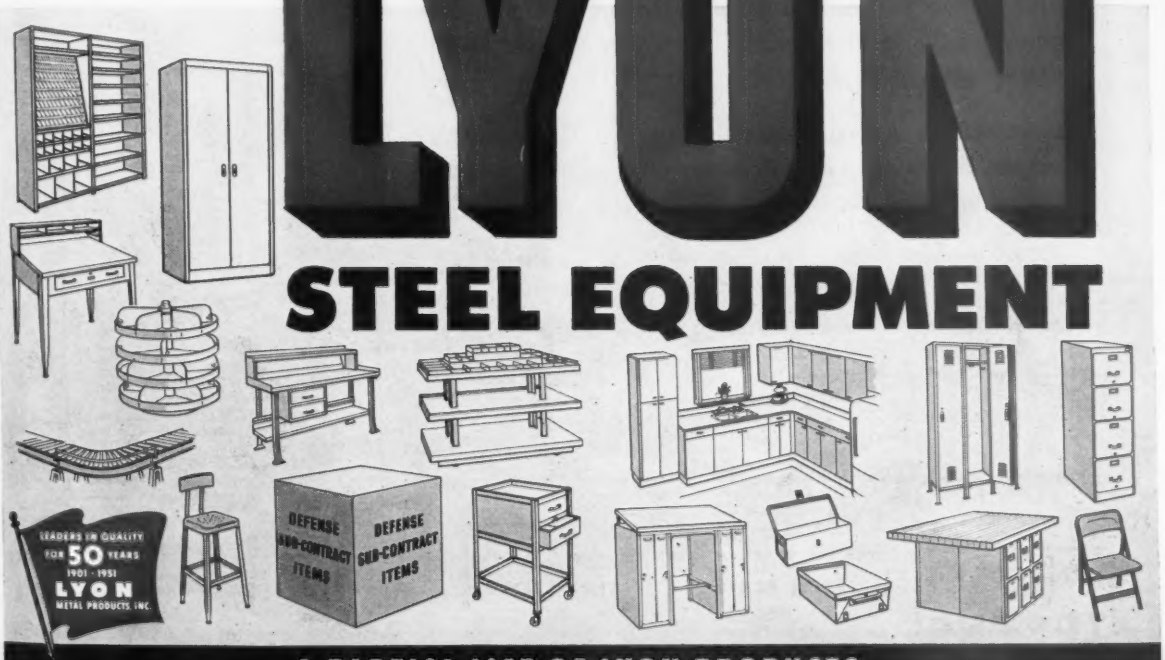

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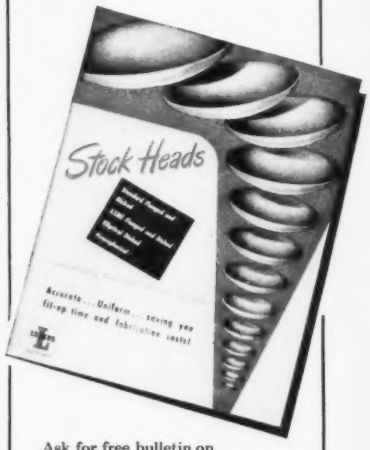

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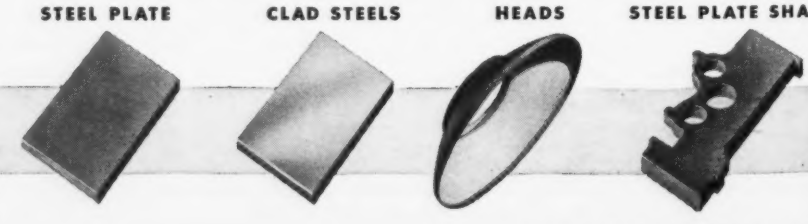

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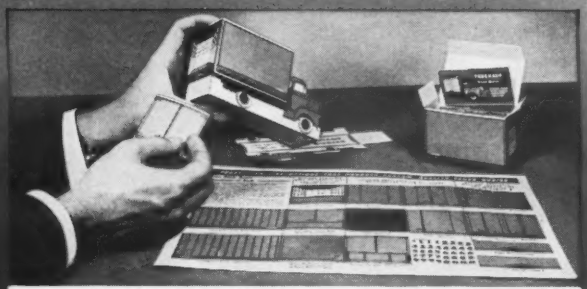

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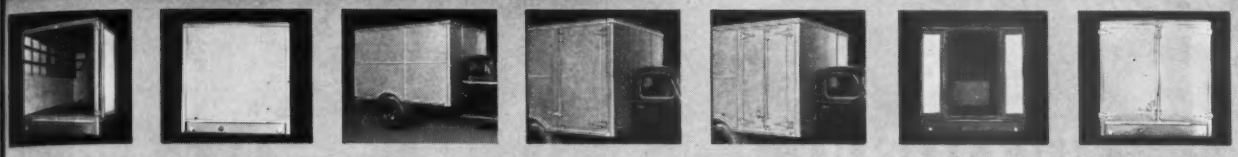

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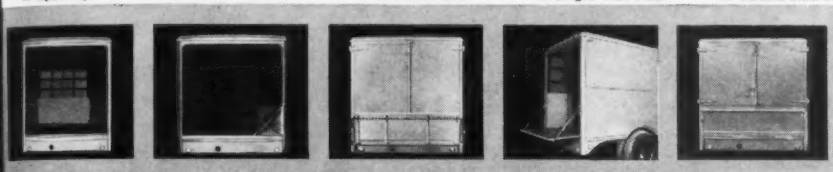

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Researchers Need WI

Editor, *Western Industry:*

I wish to thank you and your staff for the splendid cooperation you gave me in regard to the article "For Worker Efficiency and Community Approval — Make Your New Plant Easy on the Eyes," which appeared in the May issue of *Western Industry*. The two sets of tearsheets of this article which were so promptly furnished, assisted me in obtaining the information desired.

We have reviewed a copy of the April issue of your publication and feel that *Western Industry* should be added to the list of journals received by our library.

A. B. JOHNSON, Librarian
California Research Corp.
Richmond Laboratories
Richmond, California

(The article referred to above is one of a series on new Western industrial plants, designed to help the manufacturer who is considering building a new establishment.)

* * *

Use Tax on Water?

Editor, *Western Industry:*

Being a native of the State and having worked in the earliest Southern California water and irrigation systems, I am very much interested in the conservation and the utilization of what little water we do get.

It has been my idea for some time that this state should put a use tax on all water; then set up a commission similar to our State Highway Commission to handle the conservation of all water. Channeling that tax, to water use only, we would be able to put on a long range program that would not let our water escape to the sea. I know that the waters of the Santa Ana River are used three times before they get to the sea; so my idea as follows is not screwball thinking.

My idea is about as follows in principle. Water gravitates to bedrock or hardpan from melting snows and rain. In the mountains it follows the rock until it comes to a fissure; then it goes into the rock—that is, all that the fissure will take away. The surplus goes down a gully and eventually into a river. Now this is the start. Let us slow up the surplus and make the fissure take more of it underground over a longer period of time.

That process can be done by putting rip-rap check dams in on all flat spots in gullies as we descend down a mountain. Then wherever there is a good site on the mountainside for a storage basin, put it in. These storage basins need not be large, but there should be a multitude of them. Then, wherever possible, there should be a large basin for year-to-year storage, as a hedge against lack of rainfall.

Nature will help on the job as it does now by furnishing the vegetation and anchoring our rip-rap. This slowing up the descent of water to the lower levels will provide an ample supply for our growing needs. We will have to start at the top of the mountain, however, and trap the surplus before it gets into too much volume.

Another thing that will need to be done is provide for a continuous financial pro-

Continued on page 24

EDITORIAL COMMENT

Taking a Look at Ourselves

FROM New England, where the treasurer is so all-powerful by tradition that a president who becomes a dominating factor in a company gives himself the double title of president and treasurer so the world will know he really is the boss, to the Far West there is a big jump in management practices. We are indebted to Marvin Bower, partner in the firm of McKinsey & Company, for some interesting observations on Western practices, made at a recent session of the San Francisco chapter of S.A.M.

The top executive in the West tends not to be so interested in management techniques because usually the growth of business is carrying things along well enough that he does not take full advantage of the additional help that these techniques could provide. The Western top executive works hard, but not at the task of delegating details to his subordinates. As his organization gets bigger, necessity forces him toward more systematic and scientific methods.

It was Marvin Bower who also discussed before S.A.M. in San Francisco some six years ago the question of whether Western top management would be sufficiently alert in the immediate postwar period to the need for adequately compensating executives in the middle brackets to enable Western companies to hold their own against Eastern competition. T. S. Petersen, president of Standard Oil Company of California, seemed to feel some alarm a while back about the tendency of Western companies to sell out to Eastern competitors. Is this tendency an effect of the cause voiced by Mr. Bower? That would have been a good question to ask in *Western Industry's* survey of operating methods, systems and practices in the West, published last year.

Venturing After Venture Capital

PERHAPS the main reason for the alleged lack of venture capital today is that those wanting it don't venture far enough in search of it. An example of how you can get it if you try hard enough was told recently by W. A. Patterson, president of United Air Lines, before the San Francisco Bond Club. In the days when airlines were mostly dreams in the minds of people like William E. Boeing, Phil Johnson, Walter Varney and Paul Henderson, a group headed by Henderson thought for civic pride, more than anything else, Chicago should have an airline.

"They went to the usual 200 people that everybody goes to in any city to get a few dollars together to undertake something for the advancement of their community, but they were fooled," recounted Mr. Patterson.

"They went to the Reynolds, the Wrigley, Srs., to the Mitchell, Srs. But those people weren't interested in flying machine companies. Then someone got the idea of approaching their sons. So they went to Phil Wrigley, Jr., to John B. Mitchell, Jr., to Earl Reynolds, Jr., and to others of the second generation to put up the money. That move was a success, for the juniors weren't as conservative as the seniors."

Our Greatest Need

WHAT DO WE NEED most of all? Good industrial relations? A united foreign policy? Wouldn't a coaxial highway rate above everything else?

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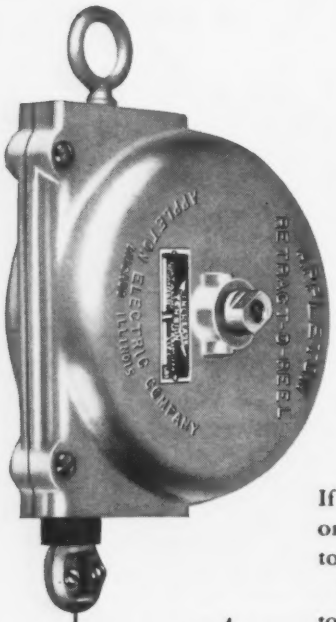

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. . . *Continued from page 23*

gram to carry it out. That is the reason for a use tax, to be wholly administered by a Water Conservation Committee.

We ship a lot of water East in the form of fruits and vegetables. I have my doubts that we get it all back in rainfall. So if we are to continue to ship, we are going to have to start storing our present wastage.

L. J. TILLOTSON
2110 Union Avenue
Bakersfield, California

(The accepted way of getting more water in the West has been to build more and bigger dams. Perhaps it would be more economical to economize on the water we now have. Do our readers agree with Mr. Tillotson's idea?)

CALENDAR OF MEETINGS

Aug. 13-15—Society of Automotive Engineers, West Coast section, at Olympic Hotel, Seattle, Wash.

Aug. 21-23—American Institute of Electrical Engineers, at Multnomah Hotel, Portland. Contact C. L. Brown, Pacific Power & Light Co., (AT 9421, Ext. 328), Portland.

Aug. 22-24—Pacific Electronic Exhibit (sponsored by West Coast Electronic Manufacturers Assn.) and Institute of Radio Engineers, jointly, at San Francisco Civic Auditorium. Contact Heckert Parker, 600 Beach St., San Francisco 9, phone ORdway 3-9379.

Aug. 29-31—Institute of Radio Engrs. and West Coast Electronic Mfg. Assn., at San Francisco. Contact Heckert Parker, Mgr., 1980 Jefferson St., San Francisco.

September (tentative)—Sub-Contractor Assistance Clinic, Los Angeles. Contact Brig. Gen. Donald Stace, Air Force Procurement Field Office, 155 W. Washington Blvd., PR-4711; alternate, Commdr. M. H. McCoy, Supervising Inspector Naval Material, 1206 S. Santee St., PR-4711.

Sept. 4-7—Pacific Coast Gas Assn., at San Francisco. Contact Clifford Johnstone, Mng. Dir., 447 Sutter St., San Francisco.

Sept. 17-20—Intl. Municipal Signal Assn., in San Francisco. Contact Dan Wallace, City Hall, Berkeley, Calif.

Oct. 3-6—Society of Automotive Engineers, Aeronautic, Production Forum, and Display, at Biltmore Hotel, Los Angeles.

Oct. 16-18—26th Pacific Coast Management Conference at Claremont Hotel, Berkeley, Calif. Contact Everett Van Every, Secretary-Manager, California Personnel Management Association, Farm Credit Bldg., Berkeley 4, Calif.

October 24 - 26 — California Section American Water Works Assn. at San Francisco. Contact A. R. Houseman, 907 Monadnock Bldg., San Francisco.

NEW *alkaline* Shell X-100 Motor Oil neutralizes Acid Action

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In addition, this new premium heavy duty motor oil possesses cleaning factors which help prevent deposits that would foul your engine.

Shell X-100 is the finest motor oil money can buy. Let your Shell dealer give your engine the protection of this new alkaline Shell X-100 Motor Oil today.

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RYERSON STEELGRAMS

Following are a few paragraphs on the steel situation as we see it here at Ryerson. We hope you will find them helpful in making the most of available steel.

Users of steel from stock get a little help from the current NPA ruling which assures warehouses of some steel. And CMP, expected in July, may use the same warehouse formula for the first few months. The ruling sets up nine months of 1950 as a base period; promises warehouses at least 85% of their average monthly receipts of most carbon steel products during that time. But, of course, this does not mean ample steel for all because: a) There is no separate provision for DO rated tonnage from warehouse — it must be taken from the 85%. b) Volume of this DO rated tonnage is growing steadily. c) General demand continues high. d) The ruling does not apply to alloy and stainless steels.

However, steel users can take the following steps which may prove worthwhile:

1. Whenever possible give us alternate sizes, gauges and qualities that may be used when your exact requirement is not available. Also let us know minimum acceptable length as we may be able to fill your order from "shorts."

2. Extend DO ratings when they apply, because by law we must give rated orders first consideration.

3. Remember that a DO rating can now be applied when ordering limited quantities of most steel products for maintenance, repairs and minor capital additions. (NPA Regulation No. 4.)

4. Keep in touch with us. Remember, our stocks change constantly; so steels we can't supply today may be on hand next time you call.

NPA Order M-14 limiting use of nickel bearing types of stainless can't help but have wide effect among users of Type 302. But Ryerson plants have added stocks of Type 430 sheets. This 17% chrome-alloy stainless resists corrosion in mild form and is a practical substitute for Type 302 in certain applications.

More on stainless changes. Restrictions on use of Type 347 stainless steel require most manufacturers to employ a substitute analysis. Type 321 (stabilized with titanium instead of columbium) has also been added to Ryerson stocks — a satisfactory alternate for 347 in almost all applications.

With defense program scrambling alloy picture, wisdom of buying alloy steels on basis of hardenability as well as analysis becomes more evident. Users forced to work with unfamiliar and leaner types can buy on hardenability with safety from Ryerson because of the Ryerson Certified Steel Plan of testing all alloys in stock — sending hardenability report with every shipment.

Ryerson named exclusive distributor of Rockrite tubing by Tube Reducing Corp. Manufacturers will welcome the closer I.D. tolerance, better I.D. finish of Rockrite for hydraulic cylinder applications. Stocks spotty but we suggest you discuss your application with us.

New Steel Data Book. Just off the press, the new edition of the Ryerson Steel Data Book contains steel specifications and comparisons, tolerances, weight and conversion table — over 250 pages of helpful information. Write for your copy, Dept. 55. Address your nearby Ryerson Plant.

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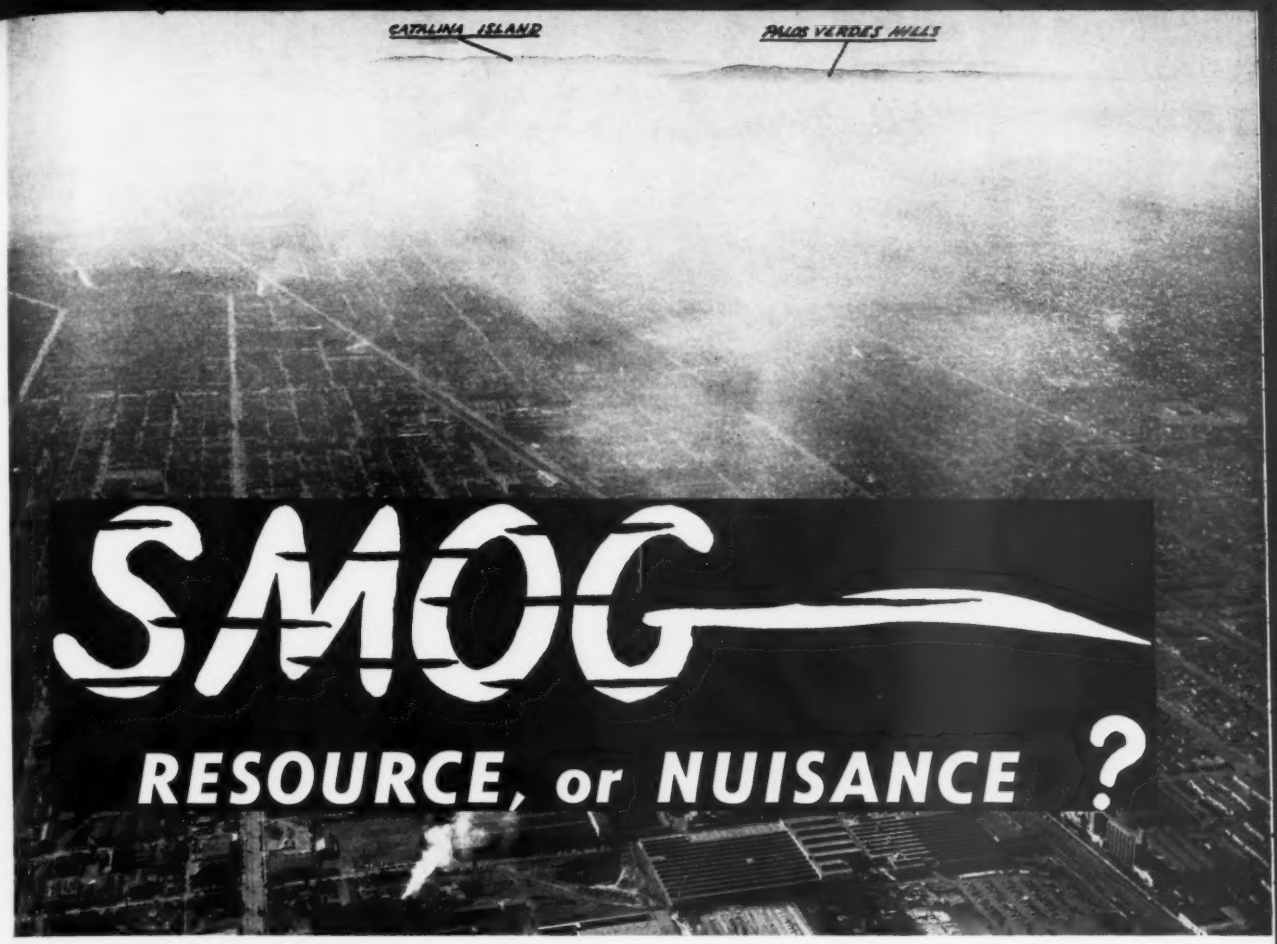


SMOG — RESOURCE, or NUISANCE ?

"Whatever the mind of man can conceive,
That, with faith and persistence can man achieve."

WHEN FIRST the public became aware of air pollution as a critical and personal problem, it was only natural that an accusing finger should have been pointed to the smokestacks of industry. Black columns of smoke or clouds of dust are obvious and easily identifiable.

Less discernible, but equally guilty, are the domestic chimney, the backyard incinerator, and the exhausts of automobiles, trucks and buses when multiplied by the countless thousands of our large cities.

Much work has been done by scientists in government, universities and industry, and much has been learned regarding critical and ungovernable atmospheric conditions, identification and classification of pollutants, and means of controlling discharge of the latter.

Los Angeles County, being one of the most critically affected areas in the country, has spared neither effort nor expense to improve conditions. In the accompanying article Gordon A. Larson, Director of the Los Angeles County Air Pollution Control District, sets forth general costs of typical air pollution control equipment, operational costs and incidental benefits derived from installations.

He cites a number of fortunate examples where direct profits have resulted, either by recovery of valuable materials or by processing improvement, from the need to control smog. In the main, however, reasonable control of industrial wastes is a necessary operating expense, and industrialists recognize their responsibility as citizens.

When more, or new, salable products can be obtained through changes in production processes or by recovery of valuable materials from the stack discharges, the operating expense may be balanced against increased income. Such direct profits are still the exception, but with continuing study and ingenuity surely the cost of smog control can be reduced.

—Editor.

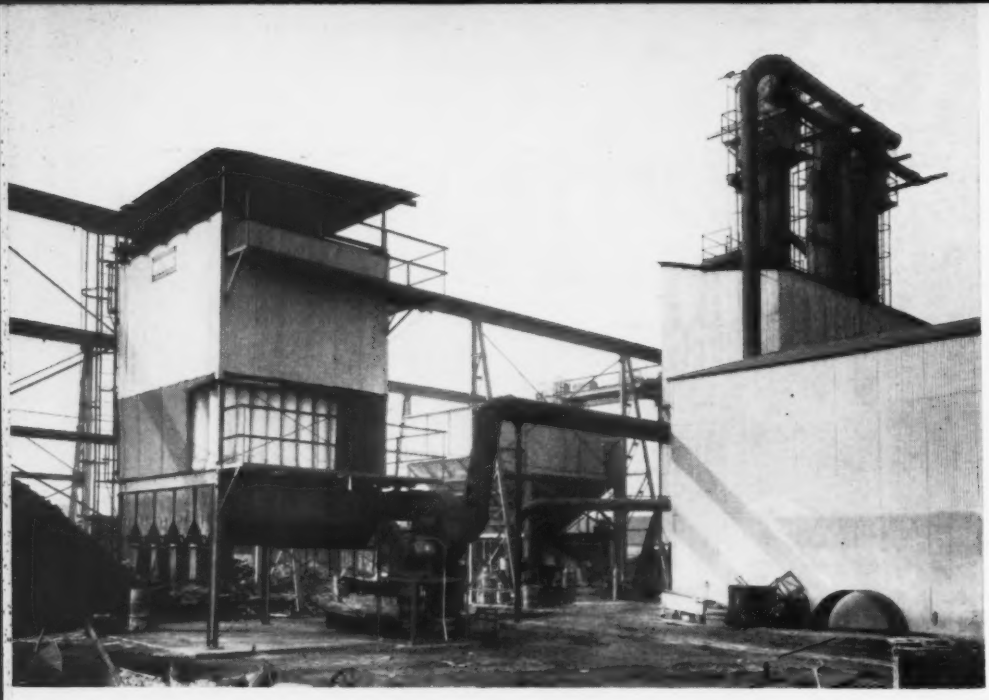
By GORDON LARSON
Director, Los Angeles County
Air Pollution Control District

THERE ARE SOME few plants in the Los Angeles area which show greater profits as a result of the demands that they undertake more control operations. For the most part, returns are through the indirect channels of improvements in commodities, acceleration of production, increased efficiency of operation, reduction of maintenance costs, and cultivation of better public and labor relations.

As a rule, industry is anxious to reduce pollutants going to the air. It is aware that to become a public nuisance is to place its interests in jeopardy.

Industrial pollution has obviously not been planned, it has merely developed with the growth of cities. Industry has endeavored to be judicious in the location of plants. In past years factories, with great care, have been purposely established in outlying districts so as not to create disturbance in nearby communities. Zoning re-

Air view at top of page is of Los Angeles area on January 25, 1951, 10:23 A.M., 2,800 ft. Picture by courtesy of Los Angeles County Air Pollution Control District. William A. Garnet, Photographer.



New Whiting five-section bag-type suppressor approved by Los Angeles Air Pollution Control District has been installed at a large Southern California malleable iron foundry. Shown at upper right are cupolas with conditioning chambers attached to upper stacks. Gases, remaining dust, fumes and smoke are directed to the suppressor for final cleaning.

Photo courtesy General Metals Corp.

quirements have been designed to foster proper land usage. However, residential areas have gradually encircled these plants and often an over-all pollution problem has developed as a result.

Now industry must cope with a situation not entirely of its own making. To meet the problem squarely requires the expenditure of considerable funds, but what can industry hope to gain in addition to clean air? There are situations where by directing attention to need of air pollution control the research and developments have resulted in finding processes that produce more or better products or in finding markets and values in the stack discharges.

Sulfur in Waste Gases

Hydrogen sulfide, inherent in refinery gases, produces sulfur dioxide when these gases are burned as fuel. Research by the petroleum industry determined that these waste gases could be stripped of hydrogen sulfide which then could be converted to valuable sulfur and sulfuric acid.

The major oil companies in the Los Angeles area not only now sell their hydrogen sulfide to chemical companies, but also derive the operating benefits from burning the cleaned refinery gases. One such chemical company produces over 80 tons of sulfur daily from these sources. Maintenance costs, formerly imposed by corrosion on heaters, stacks and lines, have been reduced to a minimum.

In connection with this process, some oil refineries were confronted with ammonia as a major impurity, which prevented them from collecting hydrogen sulfide for chemical companies. They thereupon processed the mixture, using their acid sludge to form ammonium sulfate and release hydrogen sulfide for sulfur recovery. This commercially pure ammonium sulfate can be utilized as fertilizer.

Costs and Odors Reduced

The pressure for odor control resulted in three Long Beach fish canneries installing low-temperature gas dehydration equipment to eliminate release of odors to the air. While the cost of each unit varied between $12,000 and $25,000 and power had to be increased as much as 10%, gas consumption was cut as much as 10% and maintenance costs were actually reduced.

All three companies report a general improvement in the quality of their fish meal. As much as 15% more salable material is recovered with the new process. One firm now realizes an increased value of $4.80 a ton in its fish meal because the protein, vitamin B_{12} and lysine content is higher. Another concern recovered its $13,000 expenditure for low-heat dryers in one year.

Heat Conserved, Smoke Reduced

Though tests by the Air Pollution Control District failed to disclose violations at a brass foundry, the company went to work on its pollution discharges without benefit of an engineering or research department.

Altering the firing system saved considerable fuel and the horsepower of fan motors was increased to control fume discharge. New sleeves were inserted between burners and furnace openings to conserve heat and reduce smoke.

The foundry abandoned the charging of scrap metal to the process because costs for removal of foreign material to avoid excessive smoking could

GORDON P. LARSON, Director, Los Angeles County Air Pollution Control District.

be eliminated and furnace capacity could be increased by using ingots. Considering the time and costs saved with the use of ingots, the operators report as profitable an operation and greater satisfaction with the cleaner method.

Use of a new pre-baked oil as a core-binder cut baking time more than

25% on the average and greatly reduced visible smoke from core ovens. Management, personnel and nearby residents were much gratified with the improvements initiated through the enterprise of this company.

Gold in the Dust

At a cost of $3,500, a paint company installed fume burners on its varnish cookers and greatly increased the efficiency of its personnel when the irritating fumes were thus reduced.

Many foundries, ferrous and nonferrous, are promoting extensive research to ascertain what of the materials they can collect from their stacks will have market value or will be useful in their respective operations. Tons of substances, formerly lost to the air, are recovered daily and it should be but a question of time until engineering and marketing efforts develop the utility of these potentially valuable compounds.

An operator of one gray iron foundry dusted his lawn with material from the plant baghouse and was surprised to see his grass sprout quicker and thicker than ever before.

A recent baghouse collection system at a gray iron foundry operated at 98% efficiency during tests. A large percentage of dust and fumes collected was less than one micron in particle size. Equipment of this magnitude costs about $25,000. However, baghouses for smaller processes run as low as $500 and may reach $10,000. Electrical precipitators are more expensive. One steel company is setting up four units for large operations at a total cost of approximately $650,000.

Over 50% of the substance recovered in secondary lead smelting collection systems is lead oxide which may be sold or recharged to furnaces. This material amounts to as much as 1,000 lb. a day in large plants. A zinc smelting engineer maintains that up to 50% of the material collected at his plant will eventually yield pure zinc when a treating process is completed in the near future.

Investments Come Back

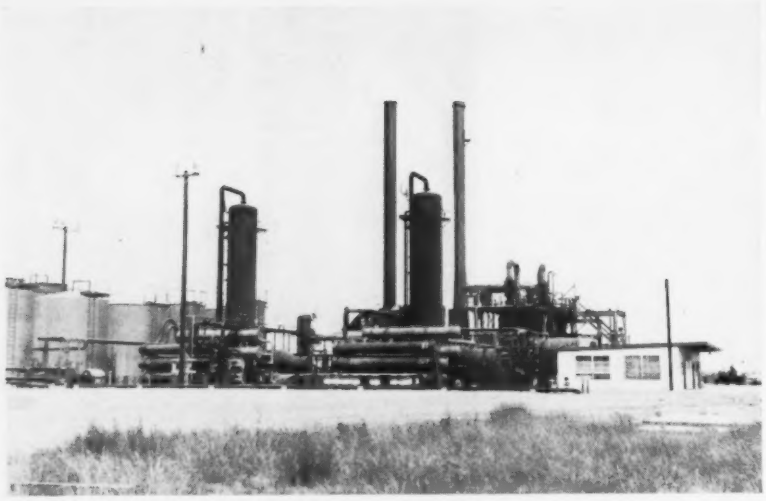
A gray iron foundry manager claims that maintenance and operation expenses on the plant's baghouse have been so minor that the accounting costs to determine the increase would exceed any amount added to the cost of unit production. Some large foundries are able to reduce fuel costs effectively with the aid of heat exchangers. Control devices on many processes are too new to determine cost figures, but the elimination of objectionable, ever-present smoke from

Brass foundry worker adjusts furnace burner. Improvised sleeve conserves heat and retards smoking.

Core maker in brass foundry adds new type oil to sand mix which cuts baking time more than 25% and reduces smoke from core oven.

Mineral processing plant worker pulls out trap on baghouse hopper to release talc fines worth $5 a ton more than regular product.

Screw conveyors carry fish meal from hashers to low-heat dehydration units which deliver 15% more fish meal than former high-temperature system.



New sulfur recovery plant erected at a cost of $1,500,000. Hydrogen sulfide from oil refineries to this and similar units produces more than 150 tons of sulfur daily in Los Angeles area.

the stack is a definite public relations benefit.

Fines recovered from perlite popping operations are ordinarily combined with the principal products, plaster, plasterboard and poured wall sections, but they are also sold as inert carriers for soaps, detergents and paints. As a paint filler the substance is excellent and withstands temperatures near 1600 deg. F.

Activated bentonite clay, used in the catalytic cracking of crude oil, is an important commodity which one clay company learned it had been losing to the air in quantity. An efficient collecting system now recovers enough clay fines to market a high-grade contact catalyst for the decolorization of fatty acids and oils.

A paint firm invested over $7,000 in fume collection equipment on its varnish cookers and now recovers two or three 42-gal. drums of fatty acids a week.

Recovered Fines Add Up

At a cost of $8,000 a mineral processing company installed equipment to collect fines lost in its grinding operations and hoped to write off the expenditure in two years at the earliest, but the recovered dust proved to be such exceptional quality that it now brings $5 a ton more than the main product. This control process alone grosses over $25,000 a year and has led to expansion of the main plant in both basic and control equipment.

Over 1,400 pounds of feed a day were being lost by a grain mill before collection equipment was procured. The recovered fines are now mixed with the main feed and production costs cut appreciably as a result.

An alfalfa mill owner was surprised to learn that cattle he grazed behind his elevators preferred alfalfa fines to their usual diet of hay and molasses when the two were placed side by side. When tests at one mill revealed that the protein content of its fines was higher than the regular product, a dry baghouse system was installed to replace a wet scrubber in order to make use of the material. Other operators market their fines for the making of alfalfa tea, a health food.

Careless operation of incinerators has resulted in loss to many organizations. A metal heat-treating and casting company had carried its incinerator as a liability until it decided to replace the laborer handling it with a higher-paid plant operator. The new man immediately set about determining what materials then being destroyed had salvage value. In a month he had produced a profit twice as great as his salary and the ashes-hauling costs combined. Grocery chains have capitalized on salvage sale versus incineration. One company receives as much as $50 a month per store for their waste materials.

Similarly, many woodworking plants burn hardwood chips and sawdust, unaware of the demand for these materials in the smoking of meats and fish. One mill sells its wood chips and sawdust to paper and plastic manufacturers and thus eliminates incineration costs as well.

Progress Outpaces Regulations

It is not accurate to say that all benefits of collection system are directly attributable to conformity with air pollution control regulations. Rather, many advances have grown out of the realization on the part of industry that pollution of the air, whether unpleasant to smell, irritating to the eyes, damaging to crops, injurious to rubber or haze-producing, is an evil in and of itself and sooner or later must be met. Fortunately, many industries have chosen to do their reckoning sooner and, even now, are engaged in independent research on methods of reducing pollutants.

Because it is impossible to alter the natural conditions which trap smog in the Los Angeles basin, it is necessary to restrict pollutants entering the atmosphere at their sources. These severe meteorological conditions have necessarily made air pollution control regulations in Los Angeles County more stringent than anywhere else in the world. Realizing this, local industries have been most cooperative in controlling emissions and have been greatly gratified with the beneficial by-products derived from these operations.

Clean Air, Free Enterprise

The District has the responsibility of assuring the public that no pollution shall go into the atmosphere that is within the ability of engineering knowledge to control. The California Health and Safety Code which enables the District to perform this vital public service is reasonable and fair to all. It provides the machinery to accomplish a job that must be done to insure a better place in which to live and work. The entire district believes that clean, pure air must be as unobstructed as free enterprise.

How SMOG-Control May Help Your Plant

Research and investigation, as the most economical control of smog and fumes for an industrial plant, may result in:

1. Improving quality and increasing quantity of products.
2. Returning extra revenue.
3. Cutting plant maintenance costs.
4. Increasing operating efficiency and accelerating production.
5. Cultivating good will of the public.
6. Improving labor relations.
7. Providing safer and more sanitary working conditions, and leading to best cooperation from personnel in keeping the operations clean.
8. Justification for company pride in contributing to industrial progress.

Automatic conveyor system and easily-controlled gas ovens are the keys to this . . .

With electro-static paint system, spray from nozzles is so fine it can hardly be seen.

PAINTING SPEED-UP

HOURLY PRODUCTION has been increased 100%, and paint cost reduced 40%, on the exterior finishing process of water heaters at Day and Night division of Affiliated Gas Equipment Company, Monrovia, California.

With the new electro-static painting system and the automatic conveyors, it takes only 25 minutes to degrease, wipe, hang on conveyors, spray paint, and dry the steel casings of the gas water heaters.

After the steel casings are formed, they are hung on hooks in groups of 12 and suspended in a trichlorothylene vapor de-greaser which removes wax and oil on the surface of the metal. Then they are hand-wiped with a "tac" rag which removes any surface soil or contamination.

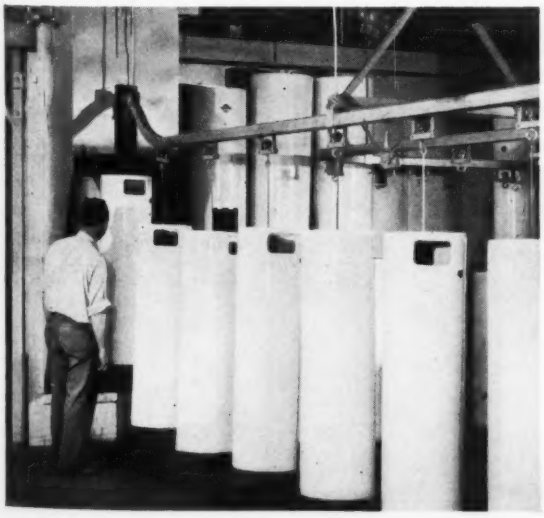
After that, the casings are hung on hooks on the conveyor on which they automatically travel at a rate of nine feet per minute through the spray booth and through the convection oven.

Automatic Process

As the casings start through the electro-static spray booth, they begin revolving slowly in front of the four automatic spray guns. Because of the electro-static charge, the mist-like paint spray is attracted to the casings.

A porcelain appearance is obtained because the paint is thinned by raising its temperature to 120 deg. F., rather than by using excessive quantities of paint thinner. The spray booth is pressurized to keep dirt and dust from falling on the freshly painted product.

The conveyor carries the painted water heater casings to the gas fired convection oven where the paint is dried at temperatures varying from 200 to 525 deg. F. Ivory and white paint finishes require from 300 to 325 deg. F., for drying.



Sprayed steel casings being automatically conveyed from gas-fired convection drying oven.

Under average temperatures, the casings stay in the oven approximately 11 minutes; at peak temperatures, for 6 minutes.

"Physical properties of gas make it the only desirable fuel for a paint drying oven. A gas oven takes less room, and is more easily controlled," Vernon Mottinger, chief process engineer of Day and Night, points out. "Temperature control is a critical item in paint drying. If paint is not baked properly, it is soft and if it is baked at too high a temperature, it discolors."

When the casings leave the oven, each one is carefully inspected. Before the electro-static paint system was installed, the rejects ran from 2 to 5%, but now the number of rejects is negligible at Day and Night.

Flexible Operation

With the new Ransburg system, not only is the quality of the paint job greatly improved because the paint is spread over the surface much more uniformly, but also it avoids runs on the casing and "drops" on the floor with consequent wastage. It is a completely automatic operation.

Besides spraying white enamel on water heating casings, miscellaneous parts of other heating appliances are aluminum or color-sprayed. For some of these drying operations, the temperature and timing of the oven must be changed.

"When these temperature changes are required, the flexibility of gas is greatly appreciated. Demands for increased or decreased temperatures are easily met with thermostatic controls," says Mottinger.

WHO WHAT WHERE ?

Everyone knows, all the time, with this work order form developed at Pacific Airmotive to keep track of progress on overhaul jobs.

PACIFIC AIRMOTIVE Corporation at Burbank, California, has realized valuable results from the application of shop inventiveness to paper work. A work order form, created by a shop employee, has not only increased efficiency in handling accounts and at the same time decreased the cost of paper work, but has actually speeded the work of overhauling aircraft engines.

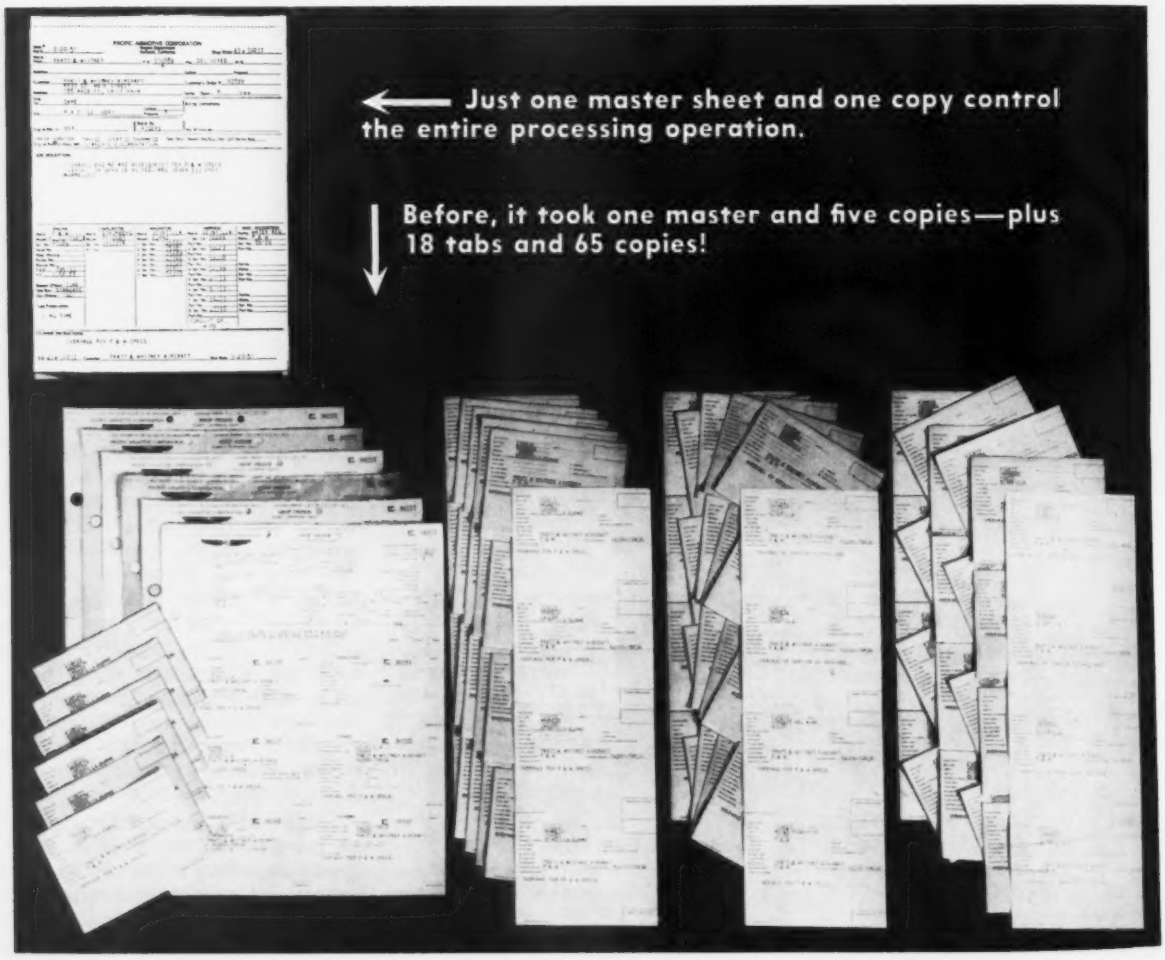
Richard T. Stovall, Production Control superintendent, working closely with J. B. Waskey, general manager of the Engine Division, was the primary developer of this system as pertaining to PAC production control.

It makes available to all production employees concerned all information that is required for them to perform their various operations, and at the same time gives them complete and simply written information that allows each department a clear understanding of the complete processing of the engine. Secondly, the lapsed time between receipt of the engines on PAC property and placing the engines into work in process has been cut to a minimum by using the new style work order form.

Speed is a vital factor in aircraft engine overhaul, as a plane is either immobilized, or a replacement engine is being used and will be needed shortly for another job. But there can be no short cuts in overhauling an aircraft engine. An engine must pass through every one of 16 progressive steps if it is to be as good as new at final check.

Action When It's Needed

In its effort to meet this demand for speed, PAC has developed hundreds of specialized overhaul tools, with the result that it has been forced to create a manufacturing division to supply


Just one master sheet and one copy control the entire processing operation.
Before, it took one master and five copies—plus 18 tabs and 65 copies!

requests from airlines and government aircraft installations. At the same time, it had developed an ingenious system of production control, which was aimed at providing a running estimate of the cost of a job.

It has been found that under ordinary types of cost collection, it is too late by the time the summaries of a work order are completed for the foreman to take any corrective action with his employees to keep them on standard operating time. The PAC system was devised to fix responsibility for slowdown of work so that corrective action may be instantly taken, to enable foremen to determine the qualifications of employees for certain specialized jobs of work, and, finally, to permit the compilation of daily reports of engine positions and weekly flow sheets showing the progress of engines along the production line.

This established system provides a historical record of the flow of all engines between some 20-odd production departments, and enables the Production Control department to compile a position report within 15 minutes following a request from the executive departments. This report will show the position of all units in the shop.

This type of system also enables PAC to make reports to the customers weekly showing the exact location of their engines in the shop, and further enables the customer to know when he will receive engines from overhaul and to do his production planning from this report.

Employee Gets the Credit

This system, which was the creation of Richard T. Stovall, the young superintendent of Production Control, was built about a central control panel with intercommunication to all basic operational stages within the plant, as well as to receiving and shipping docks and the accessory and propeller divisions. This panel was so arranged as to graph, with the use of Remington Rand control boards, the progress of all work in the shop.

The card used to control the flow of aircraft engines through the overhaul shops has the following sequence of operations listed on it:

Pre-Teardown	Harness
Teardown	Magnetos
Cleanup	Sub-Assy.
Magnaflux	Nose
Inspection	Power
Modification	Blower
Req. Written	Breed
Req. Released	Cat & Dog
Prod. Control	Final Assy.
Data Plate	Test
Carburetor	Service
Cylinders	Shipping
Remarks:	

The work order number is typed at the bottom of the card under the heading "Remarks." This information shows on the control board and is the guiding factor for positioning the engine. The control board is divided into 15 different sections which match sequences indicated on the card.

Production control board is the guiding factor for positioning engine. One glance tells who does what and when.

When work is completed in any one section, the authorized person in that section calls the control panel and gives the proper information which at that time is entered after the section calling as to the date of completion and the time of the day. The card is then moved to the section which the next sequence of operation requires.

By this method they are able to tell any stoppages or lack of production flow in any one of the designated departments. Also, by using red or other multi-colored tabs they are able to show engines that are stopped for various legitimate reasons.

In order to show break-down between different contracts, i.e. Air Force, Pan American, Flying Tiger, Seaboard and Western, different colored cards are used for each contract.

Slowdown Points Uncovered

Installation of the system uncovered a major fault in the paper work in current use in the overhaul industry. Under previous procedure, on the basis of a receiving report made on receipt of an engine at the receiving dock, and customer instructions forwarded from service sales, Production Control prepared a shop order for the overhaul job.

This shop order was made on a five-copy form containing spaces for pertinent data regarding the engine and six accessories. The last copy was made on hard paper which was perforated so it could be torn into separate cards which were attached to the engine and to its accessories. The original and the first five copies were sent to Accounting, to Production Control files, to Shipping files, to Customer Purchase Order files and the Timekeeping and Inspection, a single copy being shared by the last two groups.

There were no copies for the production groups, namely, Teardown, Cleanup, Magnaflux, Modification, Production Control Area, Sub-Assembly, Final Build-up, Test and Final Check, and there were no copies for any foreman. Instructions for these groups had to be written on separate sheets. Foremen were constrained to check the receiving report. Inspectors, of whom more than a dozen worked on various stages of every job, were forced to consult the copy which Inspection shared with the Timekeeping group.

The greatest fault, however, was that the men who were responsible for reporting to Production Control the engine's progress from station to station lacked much of the information on which to base their reports.

Less Paper, More Efficiency

To rectify this situation, and other faults in the paper procedure, Stovall set himself the task of creating a new shop order form. To overcome the shortage of copies, he employed a single carbon form which could be put on a ditto machine. He not only provided a greater number of spaces for accessories to obviate the need for writing separate sheets, but designed the form so that it would serve as a receiver and as an information sheet for billing and for shipping records. Finally, he made provision for ditto-ing copies onto the backs of sheets especially prepared for reckoning job work and time.

All supplementary instructions issued by customers while engines are in the process of overhaul may be transmitted to every department by a simple change order form that is also on ditto masters. By placing the change order form and the original master ditto work order in the machine, this creates a complete change order form showing all instructions as of that date.

IS YOUR PLANT DIFFERENT?

If you think work measurement techniques and an incentive plan can't apply to your manufacturing processes, you may be missing an opportunity to increase labor productivity.

By ALFRED I. STUART
Industrial Consultant
Portland, Oregon

PERHAPS the main reason why manufacturers in the West have not been as ready to adopt tried and proven engineering techniques as Eastern plants is their feeling that "My plant is different."

For example, management in the West frequently feels that wage incentives are not as applicable to canning and woodworking because the processes involved are strikingly different from other types of manufacturing. But the industrial consultant, on the other hand, tends to regard all manufacturing processes as having a common basic denominator — human thought and effort—and from his experience knows that the practical application of fundamental engineering principles results in usable measurement.

It is true, of course, that in going from the car loading and yard activities of a lumber company to the sawmill operations, more complex problems are encountered. Nevertheless, a careful analysis of the lumber yields and work measurements results in labor measurement standards that reduce losses from 30% down to 17%.

It should be admitted at the outset that in many types of operations, factors other than labor productivity measure performance.

But in general, process uniqueness and quality requirements are not stumbling blocks to the application of incentive compensation. Competent engineering can set practical performance standards on almost all operations, and an incentive plan can be related to the engineered performance measurement. The "unique" process is actually more a matter of detail with which Management feels it is more familiar than the consultant.

There Are Differences, But . . .

There are, however, two points of difference which must always be reckoned with seriously. The first is one to which Management typically makes no allusion, the variation in human relations between one plant and the next. Since the success of developing labor measurement standards and applying a wage incentive are more dependent upon human relations than on technological factors, the consultant's concern with this difference is clear.

The second difference which confronts the industrial consultant is the considerable variation found in payroll dollars per operation. The engineering controls established for a jobbing shop must be different from the controls established for a manufacturer of motor cars with only twenty-two different models being made.

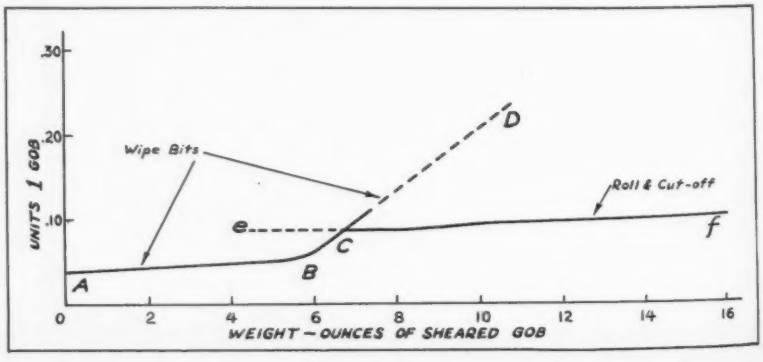
The industrial consultant faces this problem, that of adapting the measurement technique to the economics of the situation, in the majority of his assignments. Satisfactory performance standards *can* be set on every machine shop operation by time study. If the average quantity per job is eight pieces, however, time study obviously is not justified. It is the consultant's responsibility in these cases to develop measurement procedures that are practical and economical, or else terminate the engagement.

The Results Are Similar

The inadvisability of saying "My plant is different" for most operations is indicated by the following two examples in quite different types of manufacturing.

In the hand-made glass industry, the consultant was told that gathering glass and blowing glassware were an art, and not subject to measurement. Studies of the gathering operation indicated that, like the loading of a casting on a horizontal boring mill, the work varied with the weight of molten glass delivered; the remaining variables such as viscosity and punty length proved insignificant. The chart shows the relationship between the size of the sheared gob and the work value for the clean-off element. The reader will notice that two methods

Chart of operations in hand-made glass industry showed that an "art" was subject to measurement. Study determined most important variable and best method of operation.



LABOR MEASUREMENT STANDARDS FOR ENGINE LATHE

INSTRUCTIONS:
1. Circle weight on "WT." line.
2. Use handling values only in that column.
3. To calculate special machining values extend std. speeds & feeds @ 80 unit hour.

LBS. 12½ PART 43662 OP'N 5
Engineer ABC Date 8/2/50
Revised by _____ Date _____

	Weight of Piece Being Machined (figure indicates maximum pounds)														
	1/4	1/2	1	2	4	8	15	30	60	125	250	500	1000	2000	
SET-UP & TEAR-DOWN															
Constant	22	22	22	22	22	22	(44)	44	44	44	65	65	65	65	44
Preground Tool	7	7	7	7	7	7	(9) (3)	9	9	9	12	12	12	12	27
Tool Ground by Oper.	10	10	10	10	10	10	13	13	13	13	17	17	17	17	
Bores Soft Jaws	20	20	20	20	20	20	30	30	30	30	40	40	40	40	
											Total Set-up & Tear-down (Split 4/1 if necessary):				71
RUNNING VALUE															
I. Load & Unload, etc. (Combination of Elements)															
Between Centers	.46	.53	.61	.70	.80	.92	1.06	1.23	1.41	2.50	3.20	4.10	5.30	6.90	
Soft Jaws	.60	.66	.72	.78	.85	.92	1.00	1.09	1.20	1.80	2.27	2.88	3.65	4.60	
Univ. CK-1st Oper.	1.10	1.21	1.31	1.42	1.54	1.67	(1.80)	1.94	2.10	2.60	3.20	4.00	4.90	6.10	180
Univ. CK-2nd Oper.	.79	.87	.96	1.07	1.18	1.30	1.42	1.60	1.75	2.35	2.95	3.70	4.50	5.60	
Ind. CK - 1st Oper.	2.40	2.55	2.70	2.85	3.00	3.15	3.35	3.50	3.70	4.30	4.80	5.80	7.40	10.00	
Ind. CK - 2nd.Oper.	2.00	2.15	2.30	2.45	2.60	2.75	2.90	3.10	3.35	4.00	4.50	5.50	7.10	9.70	
Mandrel & Centers	.65	.76	.88	1.04	1.21	1.41	1.63	3.25	7.70	9.20	11.00	13.00	21.00	32.00	
Chuck & Tailstock	.86	.94	1.03	1.14	1.25	1.38	1.50	1.66	1.81	2.80	3.30	4.00	4.80	5.70	
Face Plate	1.95	2.11	2.25	2.41	2.61	2.80	3.30	4.00	5.00	5.80	6.70	7.80	9.20	11.00	
II. Start Cut & Clear Tool (Combination of Elements)															
Turn	.40	.40	.40	.40	.40	.40	(.84) (2)	.84	.84	.84	1.73	1.73	1.73	1.73	1.68
Face	.35	.35	.35	.35	.35	.35	(.75)	.75	.75	.75	1.55	1.55	1.55	1.55	.75
Form	.41	.41	.41	.41	.41	.41	.85	.85	.85	.85	1.75	1.75	1.75	1.75	
Bore	.37	.37	.37	.37	.37	.37	.78	.78	.78	.78	1.61	1.61	1.61	1.61	
Drill	.21	.21	.21	.21	.21	.21	.44	.44	.44	.44	.93	.93	.93	.93	
Ream	.33	.33	.33	.33	.33	.33	.70	.70	.70	.70	1.45	1.45	1.45	1.45	
Tap	.31	.31	.31	.31	.31	.31	.65	.65	.65	.65	1.35	1.35	1.35	1.35	
Chamfer	.42	.42	.42	.42	.42	.42	.87	.87	.87	.87	1.79	1.79	1.79	1.79	
Cut-off	.33	.33	.33	.33	.33	.33	.70	.70	.70	.70	1.45	1.45	1.45	1.45	
III. Change Tool in Tailstock	.25	.25	.25	.25	.25	.25	.45	.45	.45	.45	.75	.75	.75	.75	
IV. Machining Units (from Tables A-G)															1.60
													TOTAL RUNNING VALUE PER PIECE:		5.83

An illustrative example of adapting measurement techniques to the economics of the situation (see discussion in text below).

Values determined by curvilinear correlation, using standard elemental data and standard frequencies for plot-points.

are plotted, (1) wiping-off and (2) the roll and cut-off method.

The chart shows that the clean-off should be done by wiping, for gobs up to seven ounces, and that the roll and cut-off method is better for larger gobs. In the plant in which the studies were made, the art of gathering had been developed to a high degree. But some five-ounce gobs were cleaned by rolling, and some eight-ounce gobs had been cleaned by wiping. It is significant that when the facts from the studies were laid before the Superintendent, he readily conceded their plausibility and stated that he often had wondered just where the transition point was.

Incentives Versus Quality

Many manufacturers feel that the quality requirements of their product are such as to preclude the use of incentives. They fear that quality would suffer if their employees were paid financial incentives.

But in practice, it has been found that wage incentives improve quality when based on sound engineering. The incentive worker develops into a more highly skilled worker and his motion patterns become more consistent. At the Lancaster Lens Company plant, the installation of a wage incentive for the inspectors of glassware caused a marked improvement in the inspection.

An illustrative solution of adapting measurement techniques to the economics of the situation is shown in the accompanying table "Labor Measurement Standard for Engine Lathe." Entries which have been circled on the table set the labor measurement standard for machining part number 43662, operation 5. This part weighs 12½ pounds, and three preground carbide tools are used to turn and face the flange.

The table shows that the Set-up and Teardown value is 71 standard minutes, and that the running value is 5.83 standard minutes per piece. The Set-up value consists of a constant of 44 units and nine units for each of the three cutting tools employed. In determining the running value of 5.83 units/flange, it is necessary to make only ten entries on the table. In the "WT" section, *15* is circled because the weight of the flange falls in the 8.1-15 pound range.

Operation 5 utilizes a Universal chuck. Consequently the 1.80 is circled in Section I. The entries in Section II allow for two turning cuts and one facing cut. The machining value of 1.60 units comes from the standard machining tables. With the combination element form shown in this chart, an experienced estimator sets a labor measurement standard in less than five minutes, including the analysis of the blueprint. Using standard elemental data and having to extend in detail his frequencies, he would take three or four times as long to set the standard.

Tailored to Specific Economics

The practical advantage of the combination element form is that it makes profitable the use of labor measurement standards for short runs. The technique illustrated in this chart is an example of the manner in which an industrial consultant must engineer not only devices that function accurately, but are tailored to the economics of the specific plant. It is somewhat ironic that this difference-among-plants, the wide variation in payroll hours/operation presents so pervasive and challenging a problem, and yet is seldom referred to by Managements who say: "But my plant is *different*."

A COMPROMISE MATERIAL between WOOD and PLASTIC

Wood-waste-and-resin has come from the laboratory to the production line to serve many purposes and tap a big source of supply.

By HERMAN MILLER
Miller Brothers Co.*
Los Angeles

WITH THE DEVELOPMENT of new resins and the high costs of familiar materials of all types as an incentive, wood-waste-and-resin products have passed from the laboratory to the production line.

** Miller Brothers Co. are users and custom molders of wood-waste-and-resin products.*

Physical properties of wood-waste-and-resin products

Wood-waste-and-resin products cannot really claim any greater strength than plastic products. Generally speaking as wood-waste-and-resin approaches plastic in strength, its cost becomes comparable.

The physical properties of wood-waste-and-resin products vary widely depending upon the following factors:

1. Type and percent of resin used.
2. Type and particle size of wood waste used.
3. Percent moisture at time of pressing.
4. Pressure used.
5. Overlays used, if any.
6. Reinforcing ingredients used, if any.
7. Waterproofing ingredients used, if any.
8. Cure time and die temperature.

The results of physical tests, on wood-waste-and-resin products made locally, as well as in other parts of the country, are summarized in graphs and tables. These tests show that extremely high compressive strength is obtainable and that flexural strength as good as, or better than, wood is easily obtained.

It was not possible to test extensively the effects of overlays, reinforcing fibers, etc., but some data on this are included. As a comparison, the physical properties of some well-known materials are included in the graphs.

Data on heat resistance, electrical resistance, thermal conductivity and impact resistance are not included, but rough testing has indicated that these properties are somewhere between wood and plastic.

When overlays of fiber glass are used the physical properties of the surface layer can be considered to be the same as the fiber glass product used.

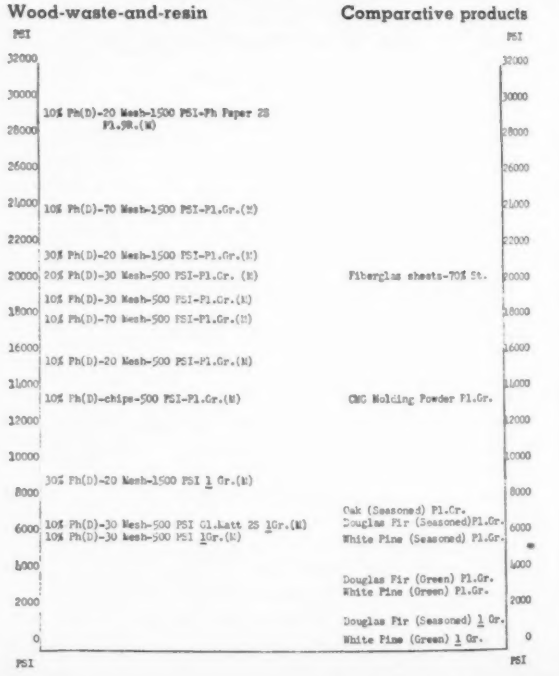
NOMENCLATURE USED ON GRAPHS

1. Percent resin (solids) as a percent of total weight = ____%
2. Type of resin used:
   a. Liquid phenolic resin = Ph(W)
   b. Powdered phenolic resin = Ph(D)
3. Grade of wood flour used (Pine and Fir unless otherwise specified):
   a. Screen size that flour will pass through = Mesh
   b. Description of wood waste:
      i Coarse shavings = CS
      ii Wood chips = Chips
4. Pressure exerted on piece in forming = ____PSI
5. Description of any overlaying or special ingredients:
   a. One side only = 1S
   b. Both sides = 2S
   c. Fiberglas cloth = Fib. gl. cl.
   d. Fiberglas matt = Fib. gl. Matt
   e. Phenolic impregnated paper = Ph. paper
   f. Phenolic impregnated cloth = Ph. cloth
   g. Melamine impregnated paper = Ml. paper
6. Direction of test load (compressive tests only):
   a. Parallel to grain (in same direction as pressed) = Pl. Gr.
   b. Perpendicular to grain (perpendicular to direction as pressed) = 1 Gr.
7. Person/or Company who conducted tests:
   a. Miller Brothers Co., Los Angeles = (M)
   b. Monsanto Chemical Co. (Mr. Sears) = (S)
   c. Monsanto Chemical Co. (Mr. Bussard) = (B)
   d. Durez Chemical Co., New York = (D)
   e. Oregon State College (MacDonald) = (McD)

EXAMPLE:

10% Ph(D) — 30 Mesh — 500 PSI — Fib. gl. Matt 2S (M) = A product consisting of ten percent dry phenolic resin (10% of total weight) and wood flour that will all pass through a 30 mesh screen. 500 PSI exerted on the piece during forming, overlayed on two sides with a fiberglas matt. Made by Miller Brothers Co., Los Angeles.

COMPRESSIVE STRENGTH



At the present time wood-waste-and-resin is used commercially to make a variety of items including: hard board, core for plywood, door panels, croquet balls, fishing tackle trays, lazy susans, toilet seats and covers, chair backs, ladies' shoe heels, picture frames, caskets and other items heretofore made of wood and/or plastic. In some cases it has replaced metal (fishing tackle trays). It is a growing industry just barely tapping the supply of available wood waste.

This product is a compromise between wood and plastic. It is formed by placing the wood-waste-and-resin mix into a heated cavity die and compressing this mix to the finished shape, using a heated punch die made to fairly close tolerances. After a suitable cure time the press is opened and the piece removed.

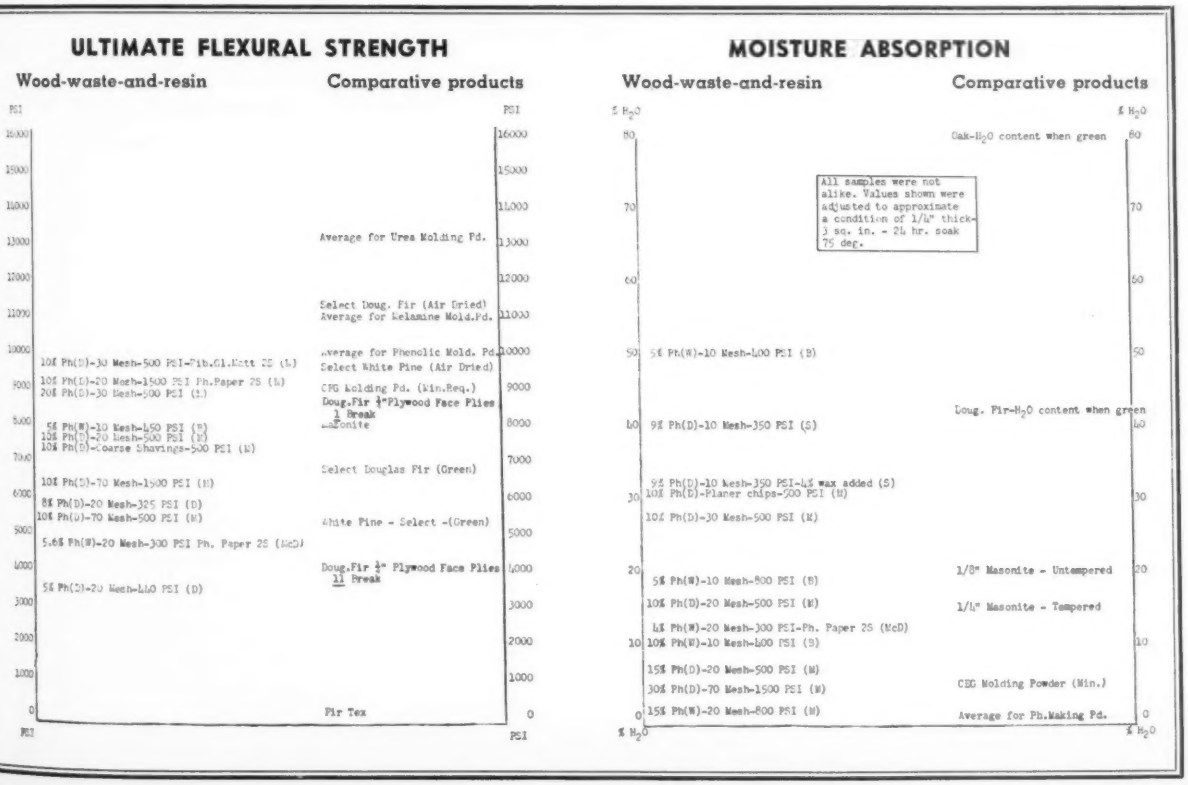
The product looks more like plastic as the percent resin increases and finer wood waste particles are used. It acts and looks more like wood as the resin percent decreases and coarser wood waste particles are used.

For a very low cost product that can be nailed and sawed, and in appearance is between Canec and Masonite, a mixture of 2% resin and wood waste chips is satisfactory. For a molded product that looks and acts very much like a thermosetting plastic, 30% resin and fine wood flour (20 to 80 mesh) can be used. Between these two extremes of resin content and particle size there is a wide variety of products that can be made.

Examples of wood-waste-and-resin products. At left, molded plywood made of wood-waste core and mahogany veneer. Entire lay-up was made in one pressing operation. Top center, oval picture frame with wood-waste core and enameled finish. At right, similar picture frame of larger size. Bottom center, shuffleboard disc with natural finish except for red dot in the center.

Wood waste is not the only extender that can be used. Other ingredients can be incorporated into the mix to give it increased strength; increased resistance to water, heat and shock loads; or to make it fireproof, or to add to its decorative effect. It is possible to overlay the product with impregnated paper, wood veneers, fiber glass, and fabrics.

There are several resins available


ULTIMATE FLEXURAL STRENGTH
Wood-waste-and-resin
Comparative products
PSI
10% Ph(D)-30 Mesh-500 PSI-Fib.Gl.Matt 2S (L)
10% Ph(D)-20 Mesh-1500 PSI Ph.Paper 2S (L)
20% Ph(D)-30 Mesh-500 PSI (L)
5% Ph(W)-10 Mesh-450 PSI (B)
10% Ph(D)-20 Mesh-500 PSI (B)
10% Ph(D)-Coarse Shavings-500 PSI (M)
10% Ph(D)-70 Mesh-1500 PSI (M)
8% Ph(D)-20 Mesh-325 PSI (D)
10% Ph(D)-70 Mesh-500 PSI (M)
5.6% Ph(W)-20 Mesh-300 PSI Ph. Paper 2S (McD)
5% Ph(D)-20 Mesh-440 PSI (D)
Average for Urea Molding Pd.
Select Doug. Fir (Air Dried)
Average for Melamine Mold.Pd.
Average for Phenolic Mold. Pd.
Select White Pine (Air Dried)
CMG Molding Pd. (Min.Req.)
Doug.Fir 1/4" Plywood Face Plies
1 Break
Masonite
Select Douglas Fir (Green)
White Pine - Select -(Green)
Doug.Fir 1/4" Plywood Face Plies
11 Break
Fir Tex
MOISTURE ABSORPTION
Wood-waste-and-resin
Comparative products
% H2O
All samples were not alike. Values shown were adjusted to approximate a condition of 1/4" thick-3 sq. in. - 24 hr. soak 75 deg.
Oak-H2O content when green
5% Ph(W)-10 Mesh-400 PSI (B)
Doug. Fir-H2O content when green
9% Ph(D)-10 Mesh-350 PSI (S)
9% Ph(D)-10 Mesh-350 PSI-4% wax added (S)
10% Ph(D)-Planer chips-500 PSI (M)
10% Ph(D)-30 Mesh-500 PSI (M)
5% Ph(W)-10 Mesh-800 PSI (B)
10% Ph(D)-20 Mesh-500 PSI (M)
1/8" Masonite - Untempered
1/4" Masonite - Tempered
4% Ph(W)-20 Mesh-300 PSI-Ph. Paper 2S (McD)
10% Ph(W)-10 Mesh-400 PSI (B)
15% Ph(D)-20 Mesh-500 PSI (M)
30% Ph(D)-70 Mesh-1500 PSI (M)
15% Ph(W)-20 Mesh-800 PSI (M)
CEG Molding Powder (Min.)
Average for Ph.Making Pd.

A chair back of coarse wood chips and thermosetting resin. Upholstery tacks are driven directly into core. Back side is hollowed out.

including thermosetting wet and dry phenolics, malamines, ureas, and some thermoplastics as well. Each of these has its particular advantage. The problem of what to use and how to use it has to be decided by the molder after he knows what physical properties are desired and what his cost limit is.

In flexural, compressive and impact strength, specific gravity, and moisture absorption the product lies between wood and plastic—just where depends upon ingredients used and resin content. In physical properties wood-waste-and-resin products have two main advantages over wood; (1) uniformity of product and (2) relative lack of grain effects. However, the grain effect in wood-waste-and-resin products cannot be eliminated entirely because the fibers also tend to orient themselves under pressure.

Wood-waste-and-resin has advantages over plastic in lower cost, lower specific gravity, and ability to hold paint well.

Molded or Flat

There are two general classes of products which may be made with wood-waste-and-resin: (1) flat building board, (2) die molded shapes.

Die molded shapes offer the largest variety of products. Here wood-waste-and-resin can be made into a finished shape with a smooth surface at a *material* cost usually less than the cost of the cheapest *rough lumber* needed to make the same product of wood.

Besides being a cheaper raw material than wood, the finished product can be made to excel in almost every important physical property.

When totally submerged in water, wood-waste-and-resin products act generally like wood, i.e., they absorb water, increase very little in length, gain thickness and weight but the big difference is that, by proper formulation, the wood-waste-and-resin products can be held to a moisture "pick-up" of less than 5% on a 24 hour test whereas wood will pick up 50% or more moisture.

Wood-waste-and-resin products, generally speaking, form an excellent base for paints, including baked enamel. By proper formulation they can be molded to take a finish without any sanding, sealing, filling or undercoating. This gives them a great advantage over wood where an enameled finish is required.

From a final cost angle, wood-waste-and-resin generally cannot compete with wood where the finished product is of very simple shape, i.e., rough lumber or building boards. Wood also has a higher resistance to impact than the usual wood-waste-and-resin product, but the latter can be improved where desired by the addition of reinforcing fibers to the mix.

But if the production volume is sufficient and if the piece is moldable, wood-waste-and-resin can be used in place of wood where the wood product:

1. Is too expensive (raw lumber high, fabrication costs high).
2. Is deficient in certain physical properties.
3. Shrinks, warps, swells, checks too much.
4. Grain effect on physical properties is undesirable.
5. Has too low a heat resistance.
6. Won't take paint readily without considerable surface preparations.

Wood-waste-and-resin cannot be used in place of wood if:

1. A specific gravity of approximately 1.0 is unacceptable.
2. The product must look exactly like wood.

Comparison with Plastics

Wood-waste-and-resin products can also be used in place of plastic products. Here their main advantage is lower cost and weight. A further advantage might arise if and when plastic becomes a critical material, difficult to obtain.

Phenolic, urea and melamine molded products have a specific gravity of from 1.4 to 1.5, woods will range from 0.4 to 0.6, and wood-waste-and-resin from 0.8 to 1.2. Some plastics won't hold paint well or stand the high temperatures necessary to bake enamel. If this is critical, wood-waste-and-resin may serve well as a substitute.

Other Products Compared to Wood-Waste-and-Resin

MATERIAL	PROPERTIES: Ultimate Flexural Strength (Modulus of Rupture) P.S.I.	PROPERTIES: Ultimate Compressive Strength (Ultimate Crushing Strength) P.S.I.
Wood—Douglas Fir-Common Structural	6,800	7,420* 910†
Wood-Waste-and-Resin	7,200	18,200*
(Gen. purpose mix—90% wood waste, 30 mesh, and 10% resin)		5,500†
Plywood—¼" Douglas Fir	8,500‡ 4,100§	—
Plastic—General Purpose Phenolic	9,000	25,000

* Parallel to grain.
† Perpendicular to grain.
‡ Face plies perpendicular to break.
§ Face plies parallel to break.

Note that the tabulated values for common structural Douglas Fir are reduced in the cheaper grades by such factors as large knots, uneven grain, moisture content, variation in growth cycles and the like. Also illustrated by this table is the serious reduction in compressive strength of wood when the direction of the grain is considered.

As mentioned earlier, wood-waste-and-resin products also vary in compressive strength depending on direction of grain but the table shows that the minimum value for wood-waste-and-resin is nearly as high as the maximum for wood and that the variation between maximum and minimum is much less than for wood.

Also note that even plywood, which is generally thought to be free from grain effects, shows a marked difference in strength depending on direction of the grain of the face plies.

Ritz crackers, baked at the rate of 4,200,000 per eight-hour shift, march out the delivery end of the band oven at Nabisco's streamlined plant.

Nabisco's new Portland plant combines . . .

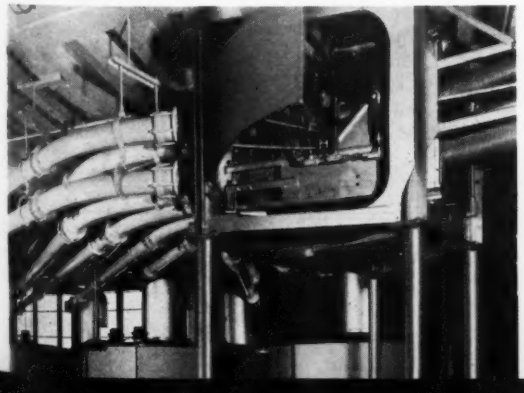
SAFETY, SANITATION, VENTILATION, EASY FLOW

NATIONAL BISCUIT COMPANY'S new $3,000,000 Portland plant is popularly regarded by Portlanders as a striking example of the "factory beautiful" idea, but to the industrialist it presents several other even more important features.

The general public sees it as a 955-ft. long building on Columbia Boulevard on the northern edge of the city, surmounted by a 120-ft. tower, the whole finished off in buff tile except for the office area where Norman red bricks provide contrast, located on a 25-acre tract and surrounded by big lawns and gay flower beds.

For the industrialist the outstanding features include the following:

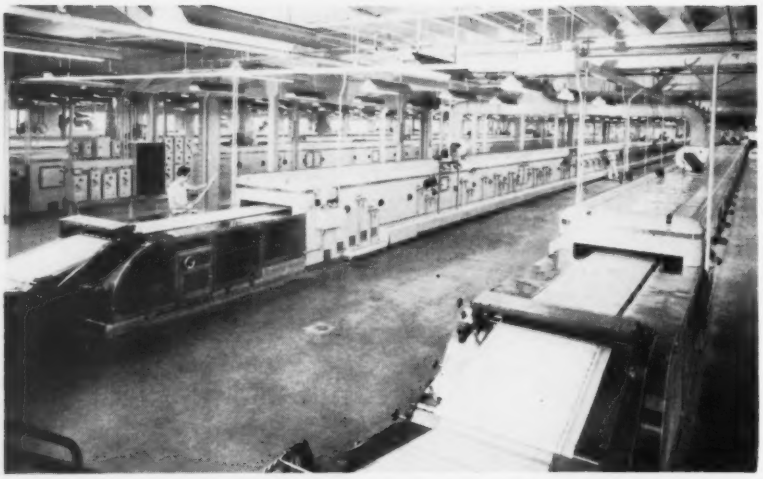
1. Minimum handling of bulk materials, as follows:
   a. An air system to unload them from freight cars and trucks and elevate them to the storage tower mentioned above.
   b. A gravity system to feed the materials back down to the mixing floors.
   c. Gravity feed of dough to the bakery floor from the mixing department.
2. Cool working conditions, provided by installing the baking ovens on the second floor, so that excess heat can be drawn off from underneath as well as from the sides.
3. Safeguarding against fire and explosion danger by:
   a. Interior sprinklers and standard fire hydrants spaced around the exterior.
   b. Glass blowout panels in the walls of the tower.
   c. A complete surfaced street circling the plant area, to provide additional access.
4. Housekeeping facilitated by:
   a. Use of hard maple floors.
   b. Consistent use of bright colors.
   c. Elimination of dust-catching ledges.
   d. Forced draft ventilation system.
   e. Built-in vacuum cleaning system, with outlets over all warehousing, mixing and packing areas.
5. The frequently unsightly appearance of the water storage tank eliminated by putting it at ground level and painting to blend with the building.



At the flick of a switch, dry ingredients are funneled pneumatically from freight car to the selector (above) and thence by pneumatic tubes to the proper steel storage bin in tower section.

Two spur tracks built in as an integral part of the bakery building serve the receiving and shipping platforms. Bulk flour and sugar are unloaded directly from the cars by suction hoses and conveyed pneumatically to steel tanks and bins in the storage tower.

Shortening arrives in special tank cars which have a steel jacket surrounding the stainless steel tank, to permit melting the contents for pumping into steel storage tanks in a storage room where controlled tempera-



Streamlined band ovens of porcelain and steel construction combine efficient operation with ease of cleaning.

ture keeps the shortening ready to be piped to the mixing machine. Molasses, raisins, cheese and some other items are stored at 55 deg. F. with controlled humidity in a large refrigerator room near the rail unloading dock.

Dough is conveyed from the mixing room by "dough dumps" or slides to the rolling and cutting machines on the mezzanine, thence on endless steel bands through the ovens where it is baked. On emerging, the products pass through cooling and drying section, after which they pass down to the packing department on the ground floor.

New Air Every Four Minutes

The ventilation system, specially designed for the Portland plant, represents the last word in this phase. To maintain ideal working conditions, big forced draft fans operate continuously to provide a complete change of air every four minutes throughout the entire bakery. Large openings in the ceiling of the first floor provide for the circulation of air from storage, processing and packaging departments on up to the roof and out through the exhaust vents.

To dissipate building heat and counteract heat from the sun during the summer months, an automatic sprinkler system known as "April Showers" is installed on the roof over the offices and a large part of the manufacturing area. It is thermostatically controlled. When the temperature of the roof rises above the pre-determined figure, the sprinkler system automatically turns on; when it drops to the proper level, the system automatically turns off. The sprinklers are supplied with 50 deg. water, 800 gallons a minute, from deep wells located within the building. The temperature of the tower, used for ingredients storage, is thermostatically maintained at 75 to 80 deg. the year 'round. This provides perfect storage conditions for raw materials.

Cleanliness Over-all

A primary consideration in the building plan was to insure cleanliness in every phase of bakery operation, and this extended even to the over-all design of the structure, the electric eye controls, and the lighting, in addition to the features previously mentioned. A full-time sanitation staff of 30 people is employed.

The hard maple flooring, 88,000 sq. ft. of it, is kept buffed and polished by the Tennant system of floor maintenance, which eliminates use of water, and imparts an immaculate polished surface. Electric floor scrubbers are used for concrete and quarry tile flooring. Asphalt tile floors in office areas and locker rooms are waxed.

The plant maintains its own incinerator for easier paper and refuse disposal. Fumes from the incinerator are water-scrubbed so that no smoke or odors will ever rise. Giant pan and can washing machines steam-clean utensils. Every piece of equipment is cleaned and shined daily.

In addition to fireproof construction, fire protection is afforded by the interior sprinklers and standard fire hydrants spaced around the exterior. Sprinkler and hydrant systems are supplied by the 300,000-gal. reservoir tank and by city water mains. Two big pumps, equipped to operate either by electricity or steam, can supply water from the tank reservoir at a combined rate of 3,000-gal. per minute.

The Builders

Nabisco's Portland bakery was planned and constructed under the direction of the company's engineering department, which is headed by R. M. Shultz, vice-president; E. A. Otocka, director of engineering; W. M. Neubauer, manager of the buildings division; and A. L. Rice, manager of the mechanical utilities division. Charles C. Taunton is manager of the new bakery. Engineer-architect for the project was Ford, Bacon & Davis, Inc., of New York, with W. O. Johnson as project engineer. L. H. Hoffman of Portland was general contractor, and Glenn Stanton of Portland consulting architect.

BUILDING FEATURES . . .

ROOF

Insulation is the big point on this plant's 290,800 sq. ft. of roof area, of which 214,000 sq. ft. are insulated by one-inch Firtex; 76,800 sq. ft. are insulated by Fibreglas.

FOUNDATION

Bakery floor rests on 1,725 Mac-Arthur cast-in-place concrete piles, driven to the bearing strata. 25,172 lineal ft. of piling required.

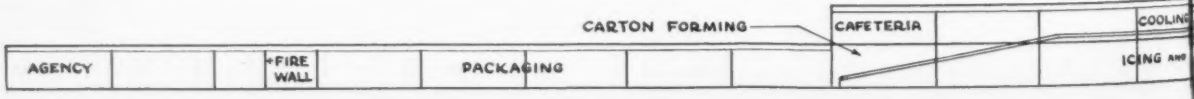
FLOORS

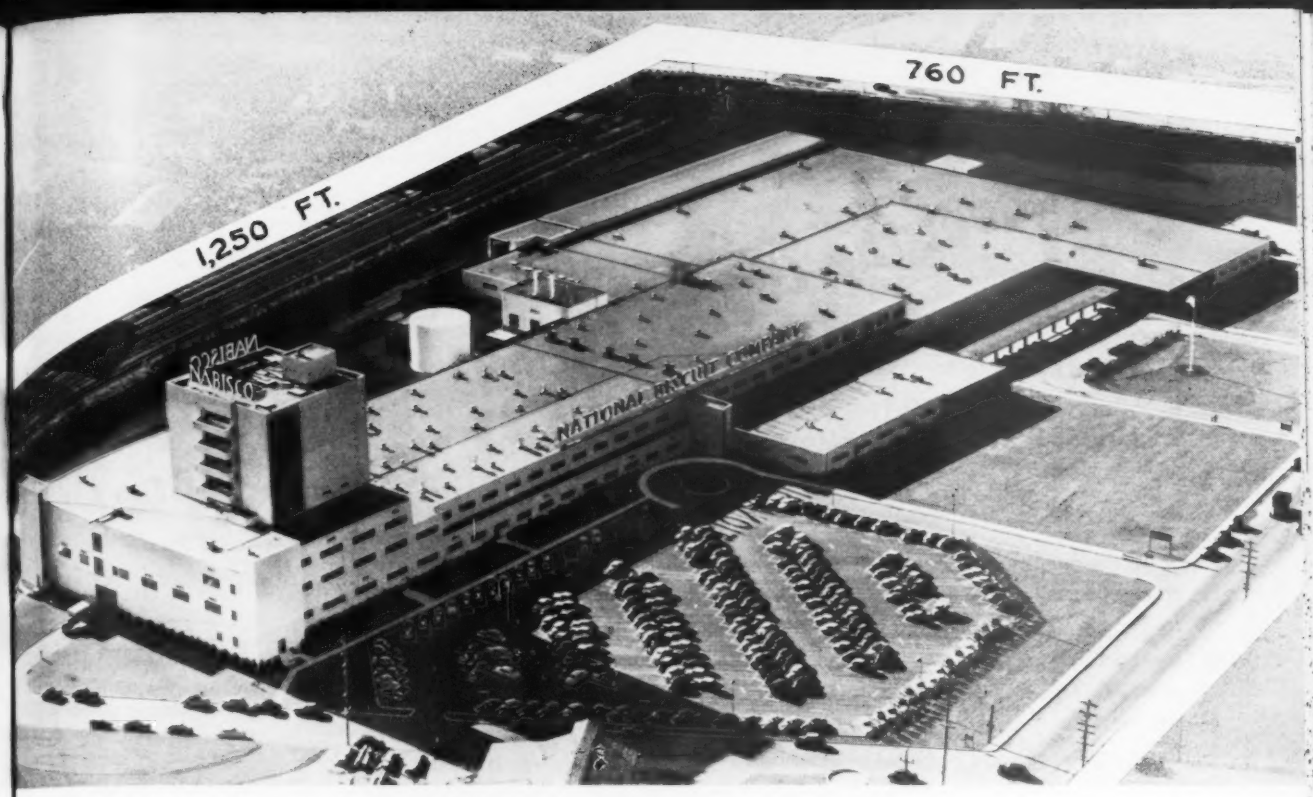
Different types of floor finish are used in this plant. Kalman floor finish is used on 167,000 sq. ft.; Terazzo on 4,108 sq. ft.; asphalt and plastic tile on 25,215 sq. ft.; floor brick on 27,750 sq. ft.; quarry tile on 2,200 sq. ft.; maple on 88,000 sq. ft.; and the remainder of this plant's floor area is concrete finish.

Tower has 51,085 sq. ft.; mezzanine, 100,815 sq. ft.; main floor, 277,445 sq. ft. Total floor area in the plant, 429,345 sq. ft.

WALLS

Exterior walls are of Natco Dry Speed-Wall tile. Office areas are of Norman red-face brick. Other exterior trim is aluminum.





Air view of plant, showing lawns and flowerbeds in front, spur tracks at rear.

Interior walls are smooth-faced buff tile. Tinted cascade blue ceilings, eyerest green doors.

SASH

Sash and exterior screens are aluminum. Aluminum window frames manufactured by Wm. Bayley & Sons, Inc. Glazed area, 14,250 sq. ft. Windows subject to glare on sunny days are of special heat-absorbent glass, manufactured by Libbey-Owens-Ford Glass Company.

LIGHTING

Fluorescent, in all manufacturing areas. "Dambrite" fixtures.

VACUUM CLEANING

System laid out by National Biscuit Company, manufactured by the U.S.Hoffman Machinery Corporation.

VENTILATION

Forced draft ventilation system manufactured by the Pacific Air Conditioning Equipment Company. Sheet metal work for ventilation: Lynch Company. Oven ventilation: Thompson Metal Fab.

FIRE PROTECTION

Automatic sprinklers: Grinnell Co. of the Pacific. Water tank: Chicago Bridge & Iron Works. Sliding fire doors: Ray F. Becker Co. Fire escapes: Portland Wire & Iron Works.

Insulation: Asbestos Supply Co. Pressure relief windows: Thompson Metal Fab. Temperature controls by Minneapolis-Honeywell.

PACKAGING MACHINERY

Supplied by Pneumatic Scale Co., Package Machinery Co. and Wright's Machinery Co.

MATERIALS HANDLING

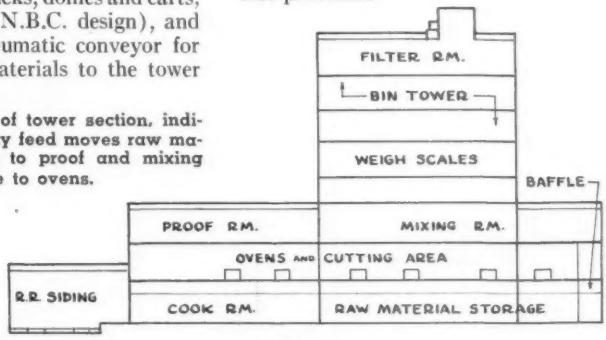
Electric lift trucks, dollies and carts, belt conveyors (N.B.C. design), and air systems. Pneumatic conveyor for elevating raw materials to the tower by the Fuller Company. Other conveyors by Mathews Conveyer Co., Gunderson Brothers, and American Sheet Metal Works.

PARKING FACILITIES

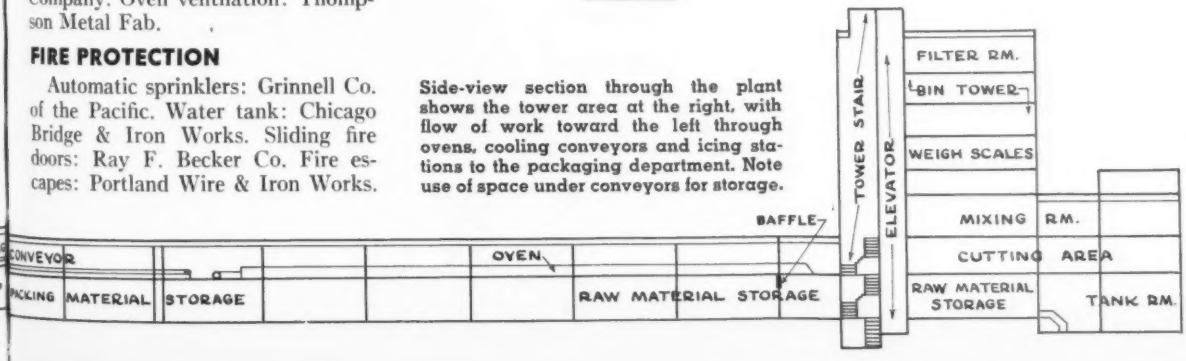
Paved parking areas furnish space for 251 cars.

GROUNDS

Sodded and landscaped, provided with permanent, individual lawn sprinklers. Shrubs, trees, and other plants also provided.



End-view sketch of tower section, indicating how gravity feed moves raw materials from bins to proof and mixing rooms and thence to ovens.



Side-view section through the plant shows the tower area at the right, with flow of work toward the left through ovens, cooling conveyors and icing stations to the packaging department. Note use of space under conveyors for storage.

let's meet the copper situation face to face!

• In the months ahead there will be some mechanical parts formerly made of copper and copper alloys that can no longer be made of these materials. Others, due to required cuts in production and D.O. rated orders getting first call, will be in limited supply. Deliveries will not be as prompt as you or we would like. In some cases you will be forced to use substitute materials. But that doesn't mean we must part company. To the contrary, the present situation should bring us closer together. Because you're going to have more problems than ever, we may be able to help you through Revere's Technical Advisory Service. This Service is backed by a wealth of knowledge accumulated over a century and a half of working with metals. Why not put that knowledge to work for you? Revere would like to collaborate with you regarding the usage, to their best advantage, of the products you *can* get. Let's get together. Two or more heads are always better than one. You can get in touch with the Revere Technical Advisory Service through the Revere office nearest you.

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Seventh and concluding article

in a series on Western water problems

WATER CONDITION FACTORS

Tabulated here are the characteristics you may encounter if locating a plant in the mountain states.

By RAY W. HAWKSLEY, Chemical Engineer, San Francisco, Calif.

IN THE FIRST two articles of this series, water analyses were given for cities in California, Washington, and Oregon. To round out the story of water quality in the eleven western states, further analyses are tabulated below.

As was said earlier, published figures of this kind are satisfactory for purposes of estimating, but it should be borne in mind that many water supplies vary *seasonally*, even though water characteristics do not change a great deal from year to year.

The sources of the data are:

Arizona—*University of Arizona Bulletin #225, "The Chemical Composition of Representative Arizona Waters." 1949.*

Colorado—*Geological Survey Water-Supply Paper #658, "The Industrial Utility of Public Water Supplies in the United States." 1932.*

Idaho—*Agricultural Experiment Station of the University of Idaho Research Bulletin #19, "Characteristics of Irrigation Waters in Idaho." 1951.*

Montana—*Montana State Board of Health Sixteenth Biennial Report. 1932.*

Nevada—*University of Nevada, "Chemical Analyses of Municipal Water Supplies, etc." 1944.*

New Mexico—*U. S. Geological Survey Unpublished Data.*

Utah—*Utah State Department of Health, "Data on Municipal Water Supplies of Utah." 1951.*

Wyoming—*Wyoming Department of Public Health Unpublished Data.*

EXPLANATION OF KEY

A—Soft water, suitable for boiler feedwater with internal treatment chemicals alone.

B—Moderately hard water, can be used for boiler feedwater with internal treatment chemicals only, but presoftening should be considered for economy.

C—Hard water. Excessive amounts of internal treatment chemicals required for boiler feedwater. Presoftening almost mandatory.

D—Very hard water. Presoftening must be used.

E—Suitable for zeolite softening.

F—Hot lime soda softening should be considered for boiler feedwater, and may be more efficient than zeolite softening.

G—Silica above desirable value. May be a problem in boilers.

H—Special study recommended.

(All values in ppm.)

ARIZONA

Location	Key	Supply	Date of Analysis	Tot. Hardness as $CaCO_3$	Alkalinity as $CaCO_3$	Chloride as Cl	Sulfate as SO_4	Total Salts ppm
Ajo	A	Well	12/48	53	120	162	120	641
Ashfork	BE	"	5/48	136	139	16	50	351
Benson	BE	City	9/46	118	196	11	15	360
Bisbee	DF	Well	6/47	187	184	20	0	328
Buckeye	DEH	"	8/46	728	68	882	620	2417
Casa Grande	DE	City	6/46	224	139	141	197	744
Chandler	CE	City	5/48	164	144	304	50	796
Chandler Hts.	CE	Well	5/48	146	138	156	70	581
Chloride	H	"	5/47	1990	314	240	1532	2951
Clarkdale	DF	City	3/49	357	422	50	0	763
Coolidge	DE	City	5/48	218	132	150	93	594
Cottonwood	DF	City	3/49	221	251	36	0	465
Douglas	DF	City	5/46	112	141	268	106	865
Flagstaff	A	City	3/49	52	30	10	0	70
Florence	DE	"	2/43	210	159	145	50	570
Ft. Huachuca	DF	Well	10/48	248	218	16	25	417
Glendale	CE	City	6/47	145	114	80	53	396
Globe	DF	"	7/46	263	198	34	20	392
Grand Canyon	BE	Springs	8/48	109	180	20	0	327
Holbrook	CE	City	11/45	127	180	70	60	540
Kingman	DF	Well	5/48	292	205	48	50	465
Litchfield Park	CE	"	4/49	153	162	36	20	318
McNary	BE	"	10/45	97	84	10	0	161
Mesa	DE	City	6/48	273	40	440	75	881
Miami	DE	Well	—	230	167	20	33	350
Morenci	DE	Well	3/49	205	186	46	35	440
Nogales	DF	City	11/47	222	233	20	20	438
Parker	DE	City	3/43	325	134	190	142	734
Patagonia	DE	Well	9/46	685	118	11	559	978
Peoria	DE	"	5/44	267	176	72	45	442
Phoenix	DFH	"	9/47	857	313	840	393	2340
Prescott	BE	City	6/45	101	102	11	15	204
Ray	DE	City	6/47	192	185	18	58	407
Safford	CF	Well	7/44	171	204	14	10	374

ARIZONA (continued)

Location	Key	Supply	Date of Analysis	Tot. Hardness as $CaCO_3$	Alkalinity as $CaCO_3$	Chloride as Cl	Sulfate as SO_4	Total Salts ppm
St. Johns	DF	Well	9/46	825	222	12	1268	2169
Seligman	DF	Well	6/48	204	220	20	30	431
Snowflake		"	11/47	206	249	41	24	519
Somerton	DF	City	6/47	665	243	181	322	1373
Springerville	DF	Well	9/45	328	325	17	24	559
Superior	DF	Well	1/47	441	328	12	203	823
Tempe	DE	City	5/48	531	190	284	100	803
Thatcher	DE	Well	10/48	240	50	1460	210	2793
Tolleson	BE	City	5/45	81	104	230	80	640
Tombstone	DE	City	7/48	343	173	40	50	438
Tucson	DF	City	9/45	312	308	37	233	898
Wickenburg	DF	City	6/47	252	228	29	175	658
Willcox	CF	City	7/48	152	273	90	51	679
Williams	DF	"	6/48	291	249	84	20	556
Winkelman	DF	Well	10/45	643	283	684	315	1994
Winslow	DF	City	5/43	700	242	327	540	3576
Yuma	DE	City	8/46	353	119	96	300	766

COLORADO

Location	Key	Supply	Date of Analysis	Tot. Hardness as $CaCO_3$	Alkalinity as $CaCO_3$	Chloride as Cl	Sulfate as SO_4	Total Salts ppm
Boulder	A	City	1/31	11	14	2	4	24
Colorado Springs	A	"	3/32	18	14	4	9	34
Denver	C	"	1931 Av.	121	85	31	43	202
Fort Collins	A	"	6/32	17	10	1	11	6	42
Greeley	B	"	2/32	63	64	3	8	17	93
Pueblo	DG	"	3/25	231	105	24	271	30	555
Trinidad	A	"	6/31	47	82	1	0	2	78

WATER CONDITION FACTORS (continued)

IDAHO

Location	Key	Supply	Tot. Hardness as $CaCO_3$	Alkalinity as $CaCO_3$	Chloride as Cl	Sulfate as SO_4	Total Salts ppm
Aberdeen	DF	Well	535	366	197	347	1188
Ashton	A	River	55	69	8	9	66
Blackfoot	DF	Well	222	231	28	54	354
Boise	A	City	59	61	2	12	95
Bruneau	A	Well	25	98	12	31	189
Caldwell	B	River	98	129	13	39	210
Diversion	A	Boise R.	40	40	5	9	63
Diversion	A	Weiser R.	58	61	7	12	72
Fort Hall	CE	Creek	177	154	30	45	270
Grace	DF	River	327	296	49	67	432
Heise	CE	"	150	147	18	40	186
Homedale	DF	Well	488	224	135	765	1320
Hot Springs	A	River	51	76	11	18	120
Idaho Falls	C	City	162	208	23	44	319
Leadore	DF	River	197	205	18	24	258
Lewiston	A	City	29	32	1	14	57
Mackay	C	River	136	125	10	20	174
Malad	DF	Well	310	264	61	27	432
Marsing	C	River	177	152	32	61	300
May	D	"	197	166	13	25	216
Minidoka	C	"	172	197	26	44	246
Pocatello	B	City	83	101	8	7	152
Post Falls	A	River	27	21	5	11	60
Presto	D	"	195	177	17	28	246
Richfield	C	"	153	148	8	22	186
Rupert	C	Well	154	130	26	49	258
Salmon	C	River	171	221	26	82	369
Samaria	DE	Spring	514	272	150	210	810
Shoup	C	River	151	146	14	22	192
Topaz	DF	"	271	272	34	41	378
Twin Falls	B	City	104	131	37	6	233

MONTANA

Location	Key	Supply	Date of Analysis	Tot. Hardness as $CaCO_3$	Alkalinity as $CaCO_3$	Sulfate as SO_4
Anaconda	A	City	1932	35	30	15
"	BF	Creek	10/31	104	149	9
Armstead	CF	Well	1932	172	172	56
Baker	H	"	1932	Tr	211	668
Bear Creek	BEH	Creek	1932	112	143	20
Belgrade	CF	Well	1932	221	189	51
"	CF	Creek	11/31	152	174	12
Belt	DE	Well	1932	341	274	108
Big Fork	CE	"	1932	128	125	20
Big Sandy	DFH	"	1932	318	400	44
Big Timber	BE	"	1932	61	70	8
"	CF	River	11/31	167	171	27
Billings	BE	"	6/32	73	67	55
Boulder	BE	Well	1932	101	55	62
"	A	Creek	11/31	50	37	21
Bozeman	BE	"	2/32	108	153	9
"	CFH	"	2/32	172	192	21
Bridger	BE	River	6/32	73	67	55
Broadview	DF	Spring	1932	540	560	126
"	DFH	Well	1932	260	671	155
Browning	CFH	"	1932	145	345	232
Butte	A	Creek	2/32	59	76	28
"	A	"	2/32	49	64	36
"	BE	River	2/32	71	104	26
Cascade	CFH	Springs	1932	180	220	30
"	DFH	Well	1932	312	382	57
Chester	H	"	1932	74	717	1867
Chinook	CF	River	9/31	178	217	42
Choteau	DF	Well	1932	301	378	48
Columbia Falls	DF	Springs	1932	132	217	11
Columbia Falls	BE	River	1/32	114	137	9
Columbus	BE	"	1/32	68	104	25
Conrad	DF	Wells	1932	275	436	140
Culbertson	DF	River	1/32	234	207	104
Cut Bank	DF	Creek	2/32	199	247	164
Deer Lodge	CE	Well	1932	123	177	32
" "	CE	"	1932	145	177	60
" "	A	Creek	6/32	17	79	18
Denton	DF	Springs	1932	331	302	78
Dillion	BE	Creek	1/32	80	101	10
Dodson	DH	Well	1932	278	305	279
East Helena	BE	Creek	11/31	82	52	30
Eureka	BE	"	11/31	105	207	8
Forsyth	DH	River	3/32	288	195	267
Fort Benton	DH	"	1/32	246	232	110
Fromberg	DH	"	1/32	378	216	312
Galen	DH	Springs	1932	246	247	94
"	DH	Well	1932	188	253	57
Gallatin Gateway	DH	"	1932	198	253	20
Gardiner	BE	River	11/31	135	134	25
Geraldine	DH	Spring	1932	199	220	93
"	DH	"	1932	362	371	226
Glasgow	DH	Well	1932	340	393	348
Glendive	DH	River	9/31	326	189	291
Great Falls	BEH	"	9/31	117	177	57
Hamilton	BEH	Creek	11/31	101	128	6
Hardin	DH	River	11/31	375	232	375
Harlem	DH	"	11/31	286	323	208
Harlowton	H	Well	1932	35	671	279
"	H	"	1932	52	549	290
Havre	DH	"	1932	354	494	280

MONTANA (continued)

Location	Key	Supply	Date of Analysis	Tot. Hardness as $CaCO_3$	Alkalinity as $CaCO_3$	Sulfate as SO_4
Havre	DH	Well	1932	345	488	234
"	DH	"	1932	219	535	438
Helena	DFH	"	1932	245	275	29
"	DFH	"	1932	221	256	36
"	DFH	"	1932	181	194	42
"	DFH	"	1932	274	268	57
"	A	Creek	7/32	32	27	29
Hinsdale	DH	Well	1932	679	702	1050
Hysham	DH	"	1932	301	201	223
Joliet	DH	Creek	3/32	209	106	166
Judith Gap	DH	Well	1932	202	421	734
Kalispell	CH	Spring	1932	124	195	—
Kevin	DH	Springs	1932	272	281	148
Laurel	CEH	River	8/31	149	140	42
Lewistown	DH	Springs	1932	343	195	160
Libby	A	Creek	3/32	48	46	11
Lima	DH	Springs	1932	213	225	22
Livingston	BE	River	6/32	84	89	46
Malta	DH	Well	1932	544	464	570
Manhattan	DF	Springs	1932	255	250	59
Medicine Lake	DFH	Well	1932	229	323	167
Melstone	DH	"	1932	1497	592	1734
Miles City	H	"	1932	45	583	717
" "	BH	River	6/32	90	93	168
Missoula	BE	Creek	2/32	24	37	27
Moore	DF	Well	1932	255	241	7
Musselshell	DH	"	1932	298	448	529
Paradise	CEH	"	1932	148	150	39
Phillipsburg	H	Spring	1932	41	143	93
Phillipsburg	A	"	1932	39	46	11
"	A	Creek	5/32	17	15	8
Plains	CE	Well	1932	141	162	6
"	A	Springs	1932	32	46	4
Plentywood	H	Well	1932	852	604	535
Polson	A	Creek	10/31	40	40	19
Poplar	CH	Well	1932	130	561	167
Red Lodge	A	Creek	2/32	29	31	11
Rexford	DE	Well	1932	230	53	69
"	BE	Creek	2/32	110	134	4
Ronan	A	"	4/32	42	46	—
Roundup	DH	Well	1932	511	354	447
Ryegate	DH	"	1932	480	345	380
Saco	DH	"	1932	735	519	1378
"	DH	Stream	7/32	228	214	142
Scobey	DH	Well	1932	227	637	207
Shelby	DH	Well	1932	328	241	205
Sheridan	BE	Creek	3/32	79	82	40
Sidney	DH	Well	1932	498	430	325
Somers	DH	Lake	11/31	383	706	15
Stanford	BEH	Well	1932	109	314	101
Stevensville	BEH	"	1932	120	162	5
"	BE	Creek	5/32	102	101	16
Superior	DF	Spring	1932	214	232	11
Sunburst	DH	Wells	1932	516	400	519
Thompson Falls	BH	Creek	1/32	96	134	Tr
Three Forks	H	Well	1932	21	238	62
" "	BE	River	5/32	101	134	16
Trident	DF	Well	1932	210	229	69
Troy	BE	Creek	2/32	66	104	11
Twin Bridges	DH	Well	1932	308	226	113
" "	BE	"	1932	90	98	24
Valier	DF	"	1932	252	433	65
Virginia City	CE	Springs	1932	134	153	11
Warm Springs	DH	Well	1932	238	185	85
West Yellowstone	DH	"	1932	304	210	140
Whitefish	BE	Creek	1/32	104	107	7
"	BE	Lake	6/32	82	119	17
Whitehall	DH	Well	1932	304	210	140
White Sulphur Springs	A	Creek	2/32	41	88	36
Wibaux	DH	Well	1932	448	494	530
Winnett	DH	Wells	1932	819	406	850
Wolf Point	DH	Well	1932	429	555	752
" "	DH	"	1932	346	479	882

NEVADA

Location	Key	Supply	Date of Analysis	Tot. Hardness as $CaCO_3$	Alkalinity as $CaCO_3$	Chloride as Cl	Sulfate as SO_4	Total Salts ppm
Alamo	DFG	Well	374	377	42	152	54	657
Austin	BEG	"	116	126	13	24	24	178
Battle Mountain	DEG	"	199	130	70	65	36	382
Beatty	AGH	Spring	52	194	35	65	66	385
Boulder City	DE	River	383	123	89	310	5	709
Boulder City	A	Treated	19	25	160	339	0	721
Bunkerville	DFG	Spring	324	448	38	107	28	570
Caliente	DFG	"	200	254	20	61	55	285
Carlin	DFG	"	180	254	20	48	50	298
Carson City	B	"	66	61	9	0	10	87
Carson Indian School	BG	"	118	90	11	0	19	153
Dayton	AG	Well	46	48	35	52	18	147
Eastgate	BEG	Spring	114	108	13	41	45	232
Elko	CFGH	Well	166	266	30	67	65	380
Ely	DEG	Spring	194	194	4	18	16	210
Eureka	DFG	"	220	240	13	54	25	403
Fernley	DFG	Well	250	269	12	115	18	415

Tabulation continued on page 46

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UNITED STATES STEEL

WATER CONDITION FACTORS (continued)

NEVADA (continued)

Location	Key	Supply	Date of Analysis	Tot. Hardness as $CaCO_3$	Alkalinity as $CaCO_3$	Chloride as Cl	Sulfate as SO_4	Total Salts ppm
Frenchman's Station	DEG	Spring	210	137	40	36	23	283
Gabbs Valley	BGH	Well	88	104	35	323	60	671
Gardnerville	BEG	"	109	151	6	24	27	225
Gerlach	DE	Spring	189	98	85	35	13	266
Glenbrook	CG	"	139	120	9	0	22	142
Goleonda	DFG	Well	280	437	110	113	30	761
Goldfield	AG	"	60	274	72	262	31	630
Hawthorne	DG	Spring	222	190	23	54	43	298
Hawthorne	BFG	Well	100	478	65	366	35	803
Hazen	CG	Spring	173	192	14	38	26	252
Humboldt	CG	"	173	192	14	38	26	252
Las Vegas	DF	Well	234	196	6	43	13	267
Lehman Caves	AG	Spring	19	38	10	0	19	53
Lovelock	BG	"	100	127	20	25	17	160
Luning	CGH	Well	165	200	115	146	76	665
Mason	DG	"	224	176	37	133	49	447
McGill	DG	Spring	187	189	6	19	17	235
Mill City	BFG	Well	124	307	67	133	27	443
Mina	DHG	Spring	289	170	22	154	51	443
Minden	AG	Well	60	72	5	22	26	144
Mountain City	A	Spring	36	6	30	0	11	80
Mountain House	DG	"	182	180	10	28	25	232
Montello	BG	"	90	119	10	30	15	168
Overton	DFG	River	181	363	110	405	30	996
Panaca	DG	Spring	197	121	25	31	40	273
Pioche	DFG	"	312	287	7	5	15	322
Reno (Hunter Creek)	AG	—	59	28	2	40	33	118
Reno (Truckee River)	AG	—	49	43	3	11	21	84
Reno (4th St. Well)	DG	—	224	148	13	67	37	300
Reno (S. Virginia St. Well)	CG	—	153	164	35	255	52	649
Reno (Crystal Springs)	CG	—	138	116	10	77	16	198
Reno (Diamond Springs)	CG	—	163	120	7	46	18	225
Reno (Sparkling Springs)	DG	—	182	172	5	65	19	278
Reno (High School Well)	DG	—	182	189	10	34	31	232
Schurz	BGH	Well	110	163	25	74	63	310
Silver Peak	AGH	"	44	284	355	172	48	1069
Sparks (See Reno)	—	—	—	—	—	—	—	—
Sutcliffe	AG	"	53	244	24	24	45	428
Tonopah	DFGH	"	185	116	16	38	60	273
Wadsworth	DFG	"	203	168	25	36	43	300
Wellington	DFG	"	249	218	52	34	21	429
Wells	CFG	"	173	210	20	0	44	305
Winnemucca	DFGH	"	230	259	65	83	53	473
Yerington	BG	"	84	120	14	21	22	145
Virginia City	AG	Lake	40	25	2	0	18	86

NEW MEXICO

Location	Key	Supply	Date of Analysis	Tot. Hardness as $CaCO_3$	Alkalinity as $CaCO_3$	Chloride as Cl	Sulfate as SO_4	Silica as SiO_2	Total Salts ppm
Alamogordo	DF	City	5/49	598	250	126	323	—	888
Albuquerque	DFGH	"	7/49	232	151	26	135	67	449
Artesia	DF	"	4/41	659	196	17	420	—	784
Carlsbad	DF	"	2/44	498	224	109	264	—	752
Clovis	DE	"	11/40	180	190	14	27	—	257
Deming	B	"	9/44	100	156	8	14	—	193
Estancia	DF	"	9/44	266	270	11	21	—	313
Ft. Sumner	DFG	"	1/44	503	175	92	470	16	1010
Gallup	CE	"	7/47	149	168	25	312	11	670
Grants	DE	"	10/44	374	138	27	199	—	555
Hobbs	DEGH	"	7/42	224	98	81	100	63	444
Hot Springs	DE	"	8/49	200	106	218	52	—	534
Jal	DFGH	"	7/42	386	144	168	145	65	685
Las Cruces	DE	"	3/48	248	147	76	126	—	442
Las Vegas	B	"	7/40	105	96	8	16	—	132
Mosquero	B	"	10/47	116	150	8	19	—	293
Portales	DFG	"	7/49	390	200	75	196	41	641
Raton	BG	"	8/45	96	93	2	10	15	123
Roswell	DG	"	6/49	687	191	134	452	15	1040
Santa Fe	A	"	6/43	30	25	2	6	11	49
Santa Rosa	CE	"	12/40	176	121	11	489	—	853
Silver City	CG	"	7/48	162	181	12	10	33	245
Socorro	BG	"	2/48	70	135	13	31	28	233

UTAH

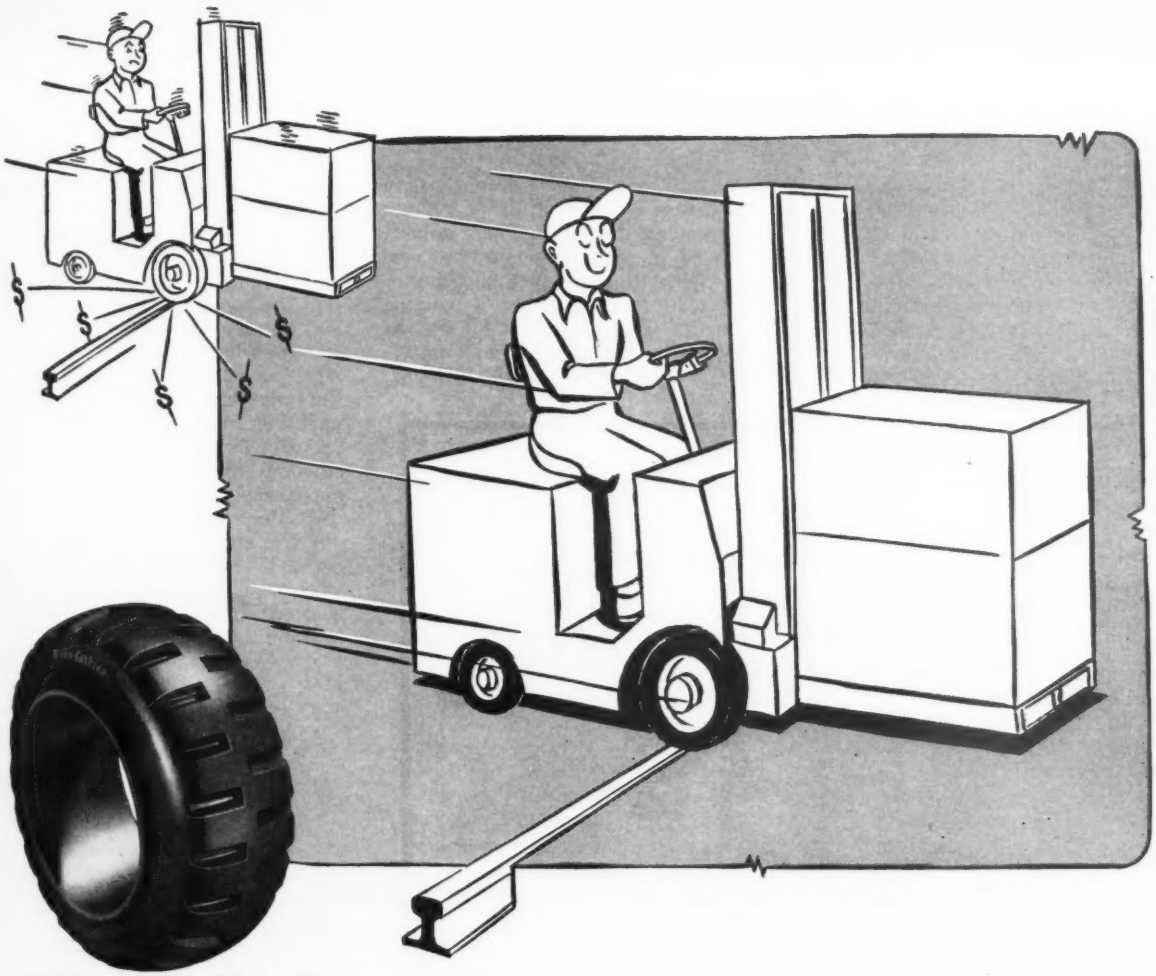
Location	Key	Tot. Hardness as $CaCO_3$	Alkalinity as $CaCO_3$	Total Salts ppm
American Fork	DE	301	186	395
Aurora	DF	289	255	354
Beaver	BE	80	80	137
Bingham Canyon	DF	363	216	582
Blanding	BE	109	98	144
Bountiful	DE	202	185	258
Brigham City	DE	202	185	233
Castle Dale	DF	307	265	393
Castle Gate	DF	287	270	426
Cedar City	CE	134	130	166
Clearfield	A	51	55	100
Delta	B	80	125	250
Duchesne	CE	151	144	161
Ephraim	DF	208	215	252

UTAH (continued)

Location	Key	Tot. Hardness as $CaCO_3$	Alkalinity as $CaCO_3$	Total Salts ppm
Escalante	CE	160	174	199
Eureka	DE	198	165	300
Fairview	DF	263	265	399
Farmington	A	45	48	78
Fillmore	DF	211	205	251
Garfield	DE	290	185	1152
Garland	DF	264	245	413
Grantsville	CE	135	130	186
Gunnison	DF	174	248	438
Heber	DE	181	182	258
Helper	DF	256	250	278
Hiawatha	DF	488	265	649
Huntington	DF	401	315	487
Hyrum	DF	213	208	244
Kaysville	A	57	57	92
Kenilworth	DF	421	340	657
Magna	DF	449	251	1506
Manti	CE	169	155	292
Mapleton	DE	181	165	214
Midvale	B	92	78	132
Milford	BE	65	133	284
Moab	CE	172	130	260
Morgan	DF	276	265	327
Moroni	DF	358	224	624
Mt. Pleasant	DF	306	306	328
Nephi	DE	196	187	234
North Logan	DF	252	242	258
North Ogden	CE	140	134	157
North Salt Lake	DF	267	210	324
Ogden	BE	116	145	189
Orem	DE	213	180	236
Panguitch	B	65	80	130
Park City	DE	214	120	329
Pleasant Grove	CE	173	155	209
Price	DF	268	254	318
Providence	DE	189	175	206
Provo	CE	140	140	178
Richfield	DF	191	240	327
Richmond	DF	218	212	259
Roosevelt	CE	154	165	252
Salt Lake City	CE	146	109	189
Santaquin	DF	251	215	300
Smithfield	DF	229	200	244
Spanish Fork	DE	381	121	554
St. George	A	55	52	77
Sunnyside	DF	200	206	248
Tooele	DF	251	221	306
Tremonton	DE	206	195	307
Vernal	B	78	74	95
Wellsville	DF	222	215	282
Woods Cross	DF	480	259	912

WYOMING

Location	Key	Date of Analysis	Tot. Hardness as $CaCO_3$
Afton	C	10/47	180
Basin	D	12/47	400
Buffalo	B	3/51	65
Casper	D	3/51	460
Cheyenne	C	3/51	130
Cody	C	3/51	130
Cowley	B	1/48	91
Dayton	C	3/51	140
Douglas	D	4/51	230
Evanston	C	3/51	155
Frontier	D	3/51	260
Gillette	D	3/51	270
Glenrock	D	1/47	190
Green River	D	3/51	240
Greybull	D	3/51	200
Hanna	D	4/51	210
Jackson	D	3/51	190
Kemmerer	D	10/47	190
Lander	D	4/51	510
Laramie	D	4/51	180
Lingle	D	5/49	240
Lovell	C	3/51	170
Lusk	D	4/51	270
Lyman	B	3/51	120
Meeteetse	C	4/51	140
Moorcroft	A	3/51	30
Newcastle	D	4/51	340
Pine Bluffs	D	3/51	200
Pinedale	A	3/51	30
Powell	D	4/51	190
Rawlins	C	5/51	160
Riverton	A	3/51	10
Rock Springs	D	3/51	240
Sheridan	A	4/51	30
Sundance	B	5/49	120
Superior	D	12/50	240
Thermopolis	D	3/51	340
Torrington	D	4/51	200
Upton	D	4/51	340
Wheatland	D	4/51	370
Winton	D	3/51	440
Worland	D	12/47	430



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"FINGERJOINTING"—

A way to grow lumber in the supplier's yard

ONE OF THE BIGGEST difficulties in the lumber business is that the trees don't grow in uniform lengths, say 14 ft. each, or in increments of two ft. If they did, the lumber supplier's job would be an easier one, and the consumer's lot would be a less expensive one.

As things now stand, the best-known way to achieve uniform length of lumber is to saw off the long pieces to required dimension. There is, however, at present, a lesser-known method of putting together the shorter pieces to "grow" lumber of required length. That process, known as "Fingerjointing," is now in commercial production in Merced, California. Carloads of fingerjointed lumber are continually being shipped as far east as Detroit.

With this new process, all of the rough lumber produced from trees except the knots, pitchy sections, shavings, and sawdust, can be economically converted into all clean custom moldings, jambs, or other desired items. Concerns that specialize in moldings, jambs, etc., can now utilize the entire tree with greater facility and improved economy from the standpoints of (1) purchasing; (2) manufacturing; (3) marketing.

To be able to purchase green lumber and handle entire mill cuts provides advantages pricewise, as well as in many other respects. For example, in manufacturing:

1. Production per man hour can be increased;
2. Waste can be minimized;
3. Maintenance costs can be reduced;
4. Material handling costs can be reduced.

Any Length, Any Width

In the marketing phase, customers can now be supplied with material in lengths they want, without paying for long lengths to be sawed off and discarded. In moldings, for example, shorts can be reduced by fingerjointing to a mere fraction of the customary 15% under eight ft. In addition, the remainder of the stock can be supplied practically all in one length, for example, 14 ft., seven ft. for casing and stops. Consequently, the age-old dilemma of excessive shorts and odd assorted random lengths can be erased.

Handling costs are reduced since the fingerjointed stock is produced in uniform widths and lengths. When ripping, any piece not previously scheduled for immediate processing (since it is uniform in size) can be set aside and scheduled for future processing without separating, deknotting, sizing, etc.

The Growth Process

Manufacturing of fingerjointed stock is basically divided into three operations, which take place after the lumber is sized by today's customary methods. These functions are:

1. De-knotting;
2. Cutting fingerjoints;
3. Gluing and pressing.

BORN with the WEST

GROWING with the WEST

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San Francisco, Calif. | Phoenix, Ariz. | Houston, Texas

This process is highly applicable to almost any lumber yard or lumber processor. Patent applications have been made concerning both the equipment and the layout. A new firm known as "Fingerjointing, Inc.," P. O. Box 1272, Merced, California, has been organized for the primary purpose of making available to the woodworking industry the necessary experience, information, and equipment for fingerjointing stock lumber.

Machines To Be Leased

Plans made by the firm are flexible, in that all new equipment developed for gluing and pressing will be made available on a lease basis. Such other equipment as is either necessary or desirable can, in many instances, be supplied from equipment already owned by user-concerns, or standard processing equipment now available on the open market may be purchased, either new or used.

Information on additional items that will be required will be provided, as will information and counsel on layout. Service information and knowledge of manufacturing procedure will be provided at normal costs.

Efforts to pursue new developments in reference to any phase of the fingerjointing process will continue, and any information of value to users of equipment leased from Fingerjointing, Inc., will be made available.

An Omission . . .

THE FURNACE and heat treating facilities at the Soule Steel Company plant in Los Angeles were designed and built by the James H. Knapp Co. This information was omitted from the description of the Soule painting system in the June issue of *Western Industry*.

High Cost of Leaks

TO KNOW WHEN it will be economical to put in a new gas main instead of keeping on repairing the old, Southern Counties Gas Company of California has an economic comparison by which actual frequency of leaks per year is compared with calculated leak frequency. The economic study includes annual fixed charges, operation and maintenance costs, including an actual monetary cost for "Public liability and property damage and public relations," using the values of 5c per foot per year in business districts, 2c in residence districts and 1c in rural districts.

Split-Second Split

ATOMIC PARTICLES can be counted in a billionth of a second by an electronic technique recently developed by Stanford physicists.

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• It's the *differences* between Snap-on professional tools and ordinary, over-the-store-counter equipment that make Snap-ons "the choice of better mechanics." Those differences add up to a mighty satisfying total!

On factory production and plant maintenance, as well as in service shops by thousands, Snap-on hand and bench tools keep tool costs low by *lasting longer* and *serving better*. That's gone on for 30 years. Which means—

Snap-on tools *must* have *everything* it takes, in right design, right steels, right manufacture . . . and *direct-to-industry distribution.*

The list of plants served by Snap-on reads like a Blue Book of American industry. Exclusive national distribution through 41 direct factory branches. Write for catalogs.

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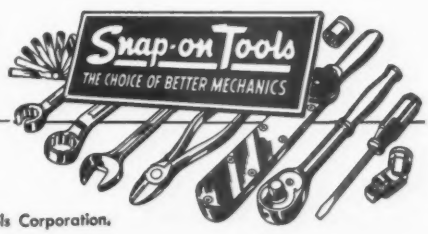


*Snap-on is the trademark of Snap-on Tools Corporation.

An incinerator fire, plus a high wind, caused this fire last month at Miles & Sons, Merced, one of California's largest trucking concerns. Damage was held to about $3,000 because Miles had the right kind of fire-fighting equipment on hand and because personnel, well-trained in its use, immediately went to work. BUT . . .

PREVENTION is your best insurance against FIRES

INDUSTRIAL FIRE losses have increased 68% in the past decade, approximating $175,000,000 or about one quarter of the total fire loss for the year 1949. At a time when the country is faced with the demands of a combined civilian and defense economy, industry's stake in fire prevention and fire protection is greater than ever.

These statistics cannot, of course, include lost hours of production, medical costs and business failures resulting from fires—all of which are often more significant than the value of the property destroyed.

Since the turn of the year the West Coast has had several spectacular fires with excessive property damage. In Hollister, California, recently, the Taggert Fruit Company plant was the scene of a $700,000 blaze. A saw and planing mill fire at Potter Valley, Calif., caused $425,000 fire damage. The state of Washington was the site of a $20,000 conflagration in a fish packing plant in Aberdeen, a $12,000 lumber plant blaze in Spokane and a fork-lift truck backfire caused a $125,000 loss in a warehouse in Tacoma.

Forty-three per cent of all businesses seriously struck by fire fail to resume operations. Of the remaining 57% who re-open their doors, 28% will go under in a three-year period.

Teach plant employees how to use and care for approved fire safety equipment. Their help in emergencies may mean negligible damage rather than complete destruction.

—Courtesy Fire Protection Institute.

By LOREN S. BUSH
Chief Engineer
Board of
Fire Underwriters
of the Pacific
San Francisco

Plant operators who have seen their production line crippled by large-scale blazes know the seriousness of lost man-hours, charred equipment and worthless stock. They are familiar too, with the long hard pull to get production back into high gear, and they know only too well what it means to see steady customers switch to a competitor while waiting for the fire-damaged plant to meet their demand again.

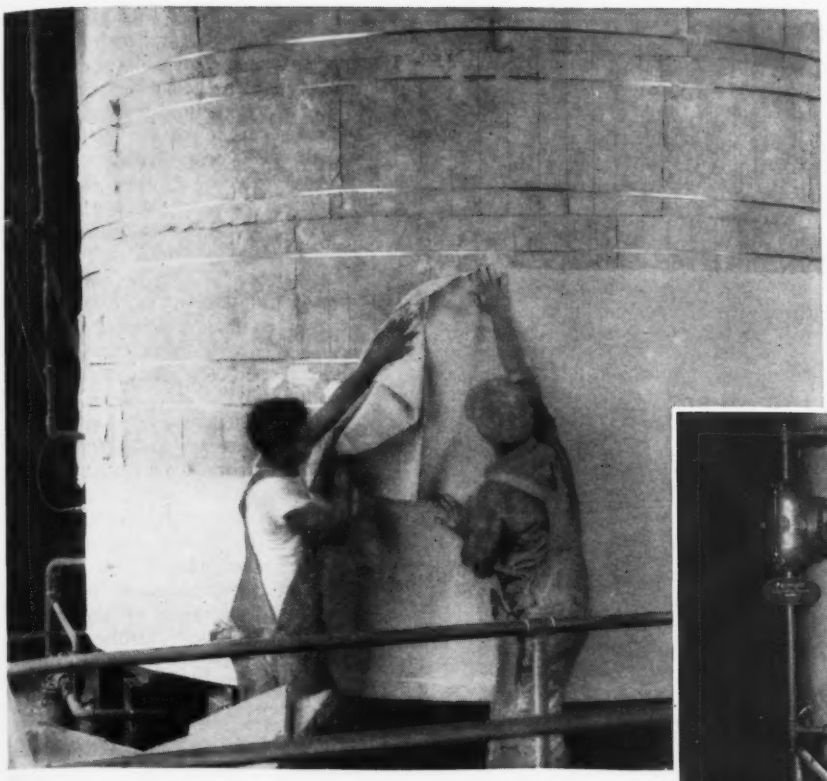
90% Can Be Prevented

Since fire safety experts assure us that 90% of all fires need never start if proper fire safety precautions are practiced and knowledge of the proper use and care of approved fire control equipment such as fire extinguishers is increased, you might take time out right now to check your plant's fire prevention and protection habits.

Properly planned and executed, a continuing fire safety program can help eliminate fire hazards. First, existing hazards must be removed and new ones prevented from arising. Second, sufficient fire control equipment must be on hand to control a small blaze.

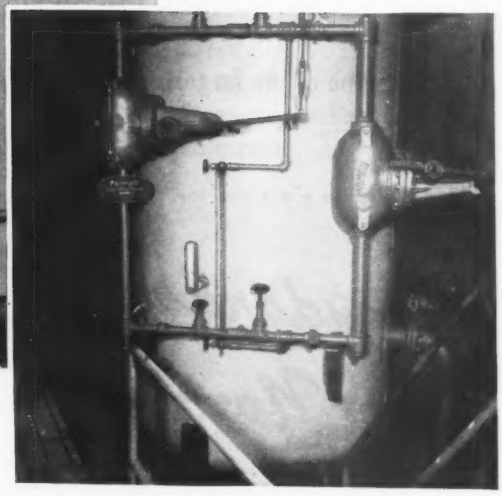
Too often the protection side of fire safety is minimized with approved fire

(Continued on page 52)



LEFT:
Stainless steel brewing tank of Wieland's Brewery—San Jose, Calif. Insulated with Fiberglas PF (Preformed) Insulation covered with canvas and waterproofing treatment.

BELOW:
Deaerating tank—capacity 120,000 lbs/hr—of Medford Corp.—Medford, Ore. Insulated with 2" thick Fiberglas MM (Metal Mesh) Blankets covered with finishing cement.



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For fuel and maintenance economy in the operation of *any* HOT or COLD piece of equipment, the insulation, in addition to being a highly efficient thermal barrier, must possess a combination of other properties or *plus values*.

FIBERGLAS* INDUSTRIAL INSULATIONS possess *all* these values and absolutely can't be beaten for thermal control in temperature ranges up to 1000°F. Thermal conductivity (k) of 0.24 at 75°F, obtainable in both *Fiberglas PF Insulations* and *Fiberglas Metal Mesh Blanket Insulation*, is extremely low.

PF INSULATION is lightweight, easy to cut and handle. It's available in five degrees of flexibility and rigidity for temperatures up to 600°F. The *Metal Mesh Blankets* for temperatures up to 1000°F are easy to apply, too. They hold together well and fit smoothly over rivet heads and other irregular surfaces.

FOR TEMPERATURE CONTROL AND CONSERVATION OF FUEL in the operation of boilers, tanks and retorts, Fiberglas Insulations are unsurpassable. Their ageless fibers of glass are incombustible, non-hygroscopic, moisture resistant, non-corrosive in contact with metal. Low maintenance and installation costs are assured.

For local sources and complete information, phone the Fiberglas branch nearest you or write to Owens-Corning Fiberglas Corp., Dept. 113-G, Box 89, Santa Clara, Calif.

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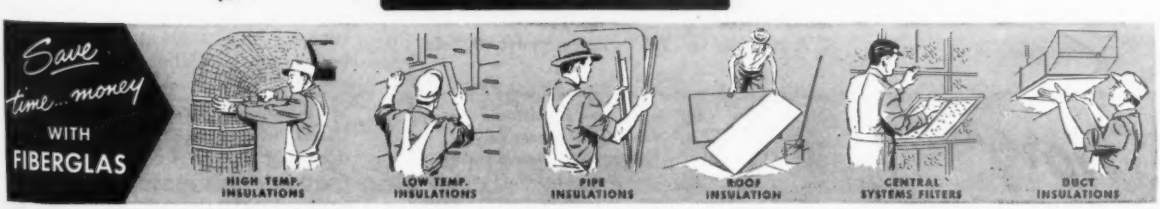
Pacific Coast Division of OWENS-CORNING FIBERGLAS **SANTA CLARA, CALIFORNIA**



*Fiberglas is the trade-mark (Reg. U. S. Pat. Off.) of the Owens-Corning Fiberglas Corporation for a variety of products made of or with fibers of glass.

FIRE PREVENTION

. . . continued from page 50

extinguishers becoming "a fire department requirement" rather than a working part of plant fire safety. Yet these devices have kept many small fires from becoming headline news. Those fires that you don't read about may be the very ones which are kept under control with approved fire extinguishers.

To be successful, plant fire safety must be an around-the-clock job, with everyone from night watchman to company president doing his share. Those hazards common to all buildings must be routed and hazards peculiar to the separate plant corrected immediately upon discovery.

Careless Smoking, 30%

Many plant fires can be traced to human carelessness. To combat this obstacle, all employees can be educated in proper fire safety habits. In areas where combustible material is present, smoking can be prohibited. If this seems undesirable, be sure to provide employees with ample facilities for cigarette and match disposal.

Thirty per cent of all the fires which yearly ravage the nation can be traced to careless smoking habits. Plant operators can make the regulation of smoking a prime concern in their safety programs. Many plants have provided employees with special "smoking rooms" to eliminate the danger of "sneak smoking." Ash trays and sand urns can be conveniently located throughout the building.

Reliable manufacturers will guarantee electrical apparatus to perform satisfactorily for years under normal conditions. Therefore, defects in electrical units in the plant should be corrected immediately upon discovery. Keep electrical motors free from grease and dirt accumulations and lubricate them regularly to prevent overheating. Electrical wiring can be checked periodically for signs of fraying or stripped insulation. Once a year, rely on the services of a competent electrician to inspect your entire plant electrical system rather than trusting to dangerous "handyman" repairs.

Watch Sparks and Heaters

Defective heating plants score high on the list of plant fire hazards. Steam pipes located too near to woodwork and chimneys, corroded and cracked, are sources of many industrial blazes. Trouble spots can be isolated and repaired before they can cause serious damage. It is always wise to station an approved fire extinguisher near your furnace for use if an emergency should arise despite all previous precautions.

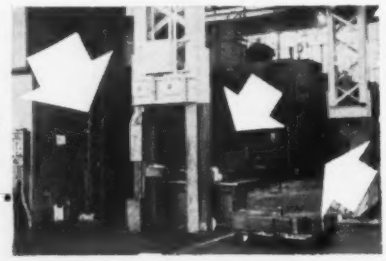
Sparks from grinding wheels and torches require constant watching. Care can be taken to use this equipment only in areas free of combustible materials. See to it that air ducts and blowers are kept free of dust since accumulations can easily be ignited by flying sparks.

Good Housekeeping Helps

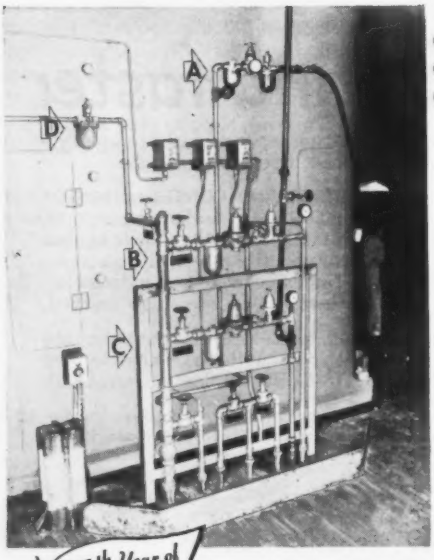
One of the answers to cutting down fire losses in industry is a system of "good housekeeping" throughout the plant. Highly combustible materials such as paint supplies, oily rags and grease waddings can be kept under cover, preferably in tightly-closed metal containers. All too often basements are the scenes of numerous cartons, packing crates and excelsior cluttering all available space. Remove trash accumulations regularly. Allow ample uncongested aisle space in your basement so that stock or equipment does not block access to important fire doors, fire extinguishers and other fire control equipment.

(Continued on page 54)

One of the largest, most modern automotive press plants



Standardizes ON Norgren FOR AIR-CONTROL PANELS ON ALL LARGE PRESSES.



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Here is a planned "package" in air controls—a tip for press builders and press users alike. (A) Norgren Lubro-Control unit serving the "iron hand" which automatically pulls stampings from the press...(B) Norgren Filter, Regulator and Relief Valve serve counter-balance cylinder, (C) Norgren Filter, Regulator, and Relief Valve serve pressure cylinder, (D) Norgren Lubricator serves air tools, such as die-grinders, etc.

Panel is standard on single action, double and triple action presses—capacities from 600 tons to 900 tons.

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designed into the all new

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GAS CUTTING MACHINE

Airco's NEW No. 50 Travograph is a rugged, all-welded gas cutting machine. Its massive, long-lived design is engineered to give fingertip sensitivity to all production operations. Used as a basic tool for multi-torch shape cutting, squaring or beveling, its outstanding accuracy slashes reject loss and working costs to a minimum.

Today's most modern production tool, the rugged new Airco No. 50 Travograph precision-cuts steel—light plates, heavy slabs, billets, forgings—to close tolerances. Here are the reasons for its remarkable exactness . . . the "why" it guarantees faithful reproduction.

1. All-welded construction provides a combination of ruggedness, resistance to vibration, and precision operation.
2. Rigidity built into the torch-bearing pantograph arms enables the torch bar to support a uniform load of *500 lbs!*
3. Perfectly-balanced when properly set on 16′ rails.
4. Ball bearings in the hinge joints make it extremely smooth operating.

For greatest operating flexibility, the new No. 50 Travograph can be equipped with three distinctly different tracing devices—manual, magnetic, or the full-automatic "Electronic Bloodhound". The "Electronic Bloodhound" needs only an outline drawing or silhouette to cut the most intricate shapes smoothly, sharply, quickly . . . and with extreme accuracy.

If your production line requires quantity flame shaping operations . . . and if close precision cutting would lower your finish-machining costs . . . it will pay you to investigate Airco's new No. 50 Travograph. For complete information write your nearest Airco office for the new catalog just coming off the press.

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Available to industry operating in the Los Angeles area are the services of California Bank, a business-minded bank, with complete facilities for industrial accounts.

California Bank Los Angeles

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

FIRE PREVENTION

. . . continued from page 52

Good working conditions and increased production go hand in hand with greater fire safety when a plant is kept clean and orderly.

With trained employees on the scene when trouble breaks out, much can be done to safeguard a plant from excessive damage. Industrial plants throughout the country are organizing their own fire-fighting brigades. Brigade members are taught to recognize fire hazards and how to cope with them. They are familiarized with the proper use and care of all fire-fighting equipment on the premises. And they are trained in methods of evacuating personnel safely from a burning building and are familiar with the location of each escape route.

At the rate of current losses, more than 10,000 lives and approximately $700,000,000 worth of property may be lost as a result of fire this year in America. There's no time like the present for West Coast industry to wage its own war against fire to help cut down nationwide fire losses.

Electrical Training Program Available

A SPECIAL training program designed to instruct industrial personnel in the latest uses of electrical motor power is being made available to Western industry by the General Electric Company. It emphasizes the widespread potentialities of electric motors and stresses new ideas, new techniques and new concepts of operation. Instruction kits, which include slide films, student booklets and a study manual, have been distributed to G-E district offices for use in presenting the course to engineers, manufacturers and contractors. With the kit any competent engineer can teach a class how to select and apply the right motor for a given task. Kits will be made available at cost to concerns which wish to set up their own employee classes.

Plastic Gas Pipe

ONE-INCH plastic pipe is now being used in lieu of copper by some of the gas companies on the Pacific Coast for new installations and 5/8-inch for inserting in old services it was brought out at a recent meeting of technical men in the Pacific Coast Gas Association. Plastic pipe has been tested to 1,000 lb. but is limited in actual service to 60 lb., and hot applications must be kept off the plastic as it softens at about 190 deg. F. it was reported. Cost is comparable to wrapped steel.

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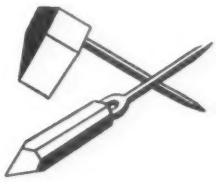

INDUSTRIAL WIRE CLOTH and
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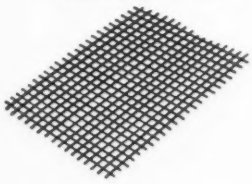

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Boston	Dallas	Indianapolis	Minneapolis	Philadelphia	St. Louis	(†sales office only)

Not everybody has to be prepared to feed 1600 people at one time, as can be done in the Boeing cafeteria in Seattle (left), but only 160 can get just as hungry and their contentment be just as necessary.

THE PLANT CAFETERIA—

How you can evaluate its cost and its worth

By FRED ROE
Operator and Owner
Industrial Commissaries
Company
San Francisco

TODAY, in-plant or industrial feeding is firmly intrenched, improving and expanding.

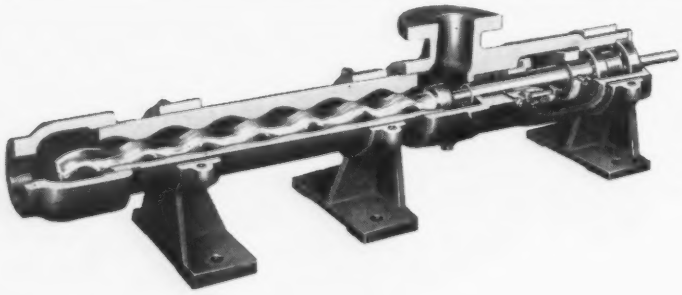
Management and labor are in agreement on its desirability. It provides one of the good work conditions that rank with financial incentive as a reward of labor. It is growing up as a natural accompaniment of the modern plants and their ventilation, light, health and safety factors, clean wash and locker rooms.

Some 30 years ago the mass feeding of workers was generally confined to the construction, lumber, mining and similar industries. By the late thirties some form of food facilities had been installed in plants employing a total of less than a million.

WHAT TO DO about in-plant feeding is a problem confronting every company with a sizable labor force. How should we handle it, and what does it really cost us?

This is the first of a series of articles by Mr. Roe dealing with in-plant feeding in its various aspects, such as organization, operation and costs. The second installment will appear in an early issue. Mr. Roe has had 20 years of experience in camp commissaries and industrial plant feeding operations.

With the mushroom growth of war plants, adding millions to payrolls, the impetus of demands for production and the manpower shortage caused a marked development of in-plant feeding. This expansion was accelerated



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Users find that Moyno "progressing cavity" pumping is not only the dependable way—it's the economical way as well. Robbins & Myers Moyno Pumps are built for long life with low maintenance. It's this performance plus economy that makes owners Moyno-boosters.

HOW ABOUT YOU?

These amazing pumps have solved hundreds of tough pumping problems. If you're interested in good pumping, investigate the advantages Moynos have to offer. They'll stand up where other pumps fail, delivering positive pressures without pulsation. There's a Moyno for every purpose. Chances are they're just what you're looking for. Why not inquire today?

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by foods rationing; locating plants far from food centers; the three-shift schedules which released workers when public restaurants were closed; higher earnings, and the new type of workers, including women, who had never carried a lunch pail.

Surveys disclosed that in 1945 some 12 million workers were using in-plant food facilities. A recent estimate states that 80% of industries have some type of food service for their employees.

What Plant Managers Say

That the practicability and large contribution to good working environment of on-the-job feeding had been demonstrated to management was disclosed by interviews with 166 plant managers.*

96.3% of these said they planned to continue in-plant feeding.

55.5% of those answering said the service had resulted in increased production rates.

41.8% that it had decreased absenteeism;

42.5% that it had reduced turnover;

84.9% that it had improved health and morale; of the total,

11 plants reported that they would improve and extend the service.

Management's replies to requests to list the advantages and disadvantages of in-plant feeding, proved, in general, that the advantages overwhelmingly outweighed the disadvantages.

ON THE HOT-DOG FRONT IN 1942

"The lunch-hour did not tend to relieve tension or to increase a worker's output. Unless he brought his lunch he was not likely to find adequate bench space upon which to sit, nor would he find enough table space in the few restaurants in which he might order a decently clean meal.

"So he streamed out with 8,000 others who ate simultaneously, dashed recklessly across the street and pushed through the huge mob up to the hot-dog stands and beaneries. He screamed out his order, and when it was chucked into his outstretched hands retreated to the nearest curbstone and settled himself with feet in the gutter."

—Lewis S. Thompson, in *Harper's*, April 1942

The continued employee acceptance of on-the-job feeding is illustrated by a comparison, from the writer's records, of the number of employees served during June 1944, with those served during June 1950, in the same industry. Some food facilities were

* From a research conducted for Pan-American Coffee Bureau by Fact-Finders, Inc., and John H. Graham Research, Sept., 1945.

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E. B. Johnson, *Freight Traffic Manager*
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Santa Fe—all the way

Santa Fe

open before and after shifts, serving in-coming and out-going workers, in addition to regular lunch hours.

Out of the total personnel, 59.5% were served foods with drinks in 1944, and 48% in 1950; 61.8% were served coffee, milk, etc., in 1944 and 55% in 1950.

These figures show a high average employee patronage; compact plants with a concentrated personnel population may serve a larger percentage. Other factors affecting employee usage of facilities are their location, serving hours and prices.

The decision of management to provide in-plant food facilities includes consideration of the amount required for a system suiting the plant type, location, area and employee distribution. Comparative cost data compiled from surveys and operating experience have established averages for capital expenditure required for the selected operation. These include self-contained cafeterias, main cafeterias with branches, central commissaries for processing foods for distribution through canteens or stands.

As with other industrial production problems, planning and installation of food production and distributing systems require operating and technical planning knowledge, collaborating with the plant's engineering and personnel executives, for maximum efficient operation.

Planning includes layouts of production and distribution areas in accordance with meal-load factors. Operating includes the detailed knowledge of procurement, processing and distribution of foods. Controlling covers the variable materials and labor costs, and limiting the fixed costs.

Measuring the Efficiency

Efficiency of an operating food system may be measured by the percentage of the personnel using the plant's facilities. When analysis indicates this is below a comparative normal percentage, the rearrangement of equipment to speed service, extending hours of service, revising and re-pricing menus and other changes suggested from experience should promote increased patronage and reduce costs.

The food service business is an exacting one. Choosing meals to please all members of a family used to a good table is a regular home problem, and it takes experience and a skilled staff to satisfy a large majority of regular patrons within reasonable expense limits.

When management has decided on an industrial feeding program, the decision whether to operate the facilities themselves or contract with a food contractor for operation will be considered. Many larger companies, including such utilities as the telephone and power, operate their own.

Prevalent Fee Systems

The majority of industries, regarding food servicing as outside their field, employ food contractors under various fee arrangements. The commoner agreements include the following:

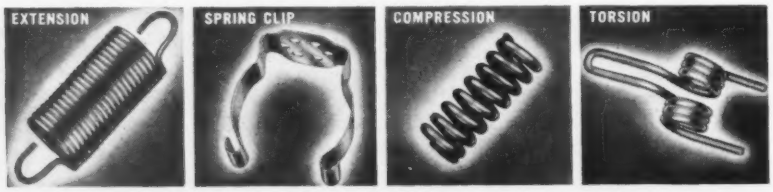
1. A fixed fee for services without regard to income.
2. A guaranteed fee plus a percentage of the income above a fixed amount.
3. Full control by contractor with no profit limit.
4. Control by contractor with profits limited to 5% or less, balance of profits, if any, usually applied by the company to amortization of facilities costs.
5. A limited subsidy plus fee.
6. A limited subsidy plus fee and limited profits.

Smaller plants have special problems. Equipping and operating costs are higher in proportion to the payroll

(Continued on page 60)

Some like 'em hot ... Others like 'em cold. It takes all kinds of women—and springs—to make us tick. Today, we're bending 'em over a hot stove, making the west's best hot coiled springs. Tomorrow, we'll roll 'em cold to keep other customers clamoring for California springs—as they have since '23. Why not call us today—for any spring in all sizes, types, wires.

Catalog available upon request.



When it's spring-time call **California Spring**

COMPANY • INCORPORATED

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We've built new facilities for your production!

Many manufacturers who need increased production are using Valley's expanded capacity for both prime contracts and sub-contracts.

We invite you to join them. Let us produce all of your requirements, or part of them...

Send us your plans, or let us help you engineer special plans. We're easy to work with—and we deliver every order *on time!* Complete facilities, now being more than doubled, are manned by trained crews experienced in machine shop, fabrication, welding and assembly work.

Write, wire or telephone.

VALLEY

FOUNDRY & MACHINE WORKS, INC.

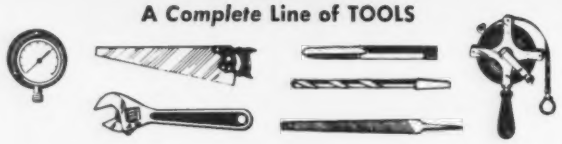
2718 East Avenue · Fresno, California

...IS HALF THE BATTLE

We've never been called upon to make a parachute delivery—but if that is the quickest and best way to reach you when you need us most, you can be sure we'll use a parachute drop. Our shipping department makes minutes count from the moment your order is taken out of stock. By train, truck—and by air, we dispatch your order over the quickest, most economical route. It will pay you to "call Republic." Over 35,000 quality items, and a minute-conscious, highly trained staff insure, at all times, your getting what you want—when you want it.

CALL REPUBLIC SUPPLY
...first for service

A Complete Line of TOOLS



... and Piping, Rubber, Wire Rope, Industrial Supplies and Machinery

THE REPUBLIC SUPPLY COMPANY OF CALIFORNIA
AN INDEPENDENTLY OWNED AND OPERATED COMPANY SERVING WESTERN INDUSTRY
LOS ANGELES • OAKLAND • SANTA FE SPRINGS • BAKERSFIELD • WILMINGTON • HUNTINGTON BEACH
LONG BEACH • STOCKTON • SAN JOSE • VENTURA • SACRAMENTO • AVENAL • FRESNO
SANTA MARIA • CUYAMA • NEWHALL • TAFT

THE PLANT CAFETERIA

. . . continued from page 58

or number served, and the food contractor is not interested in the small returns, so management or a management-sponsored employee organization takes over the service, sometimes assisted by an operator on an advisory fee basis.

Most in-plant operations price the food products somewhat lower than prevail locally, subsidizing this service to employees. Managements generally are reconciled to a reasonable expense, recognizing the benefits.

All industries, however, do not have the same cost experience. A recent survey reports that, out of 20 plants interviewed, one makes a profit on its food operation, one breaks even, 18 have a loss operation of 2.9% to 30%. These "loss operations" are presumably figured on the gross income.

Man-Hour Costs System

A more accurate and efficient standard for comparison of industries cost experience with in-plant feeding is necessary. I suggest, as a measurable factor, to base the cost of the service on total man hours worked, presuming the facilities are available to all employees.

Thus, in a 500 payroll factory working 4,000 man-hours, a direct loss of $40.00 per day on the food operation represents a 1c per man-hour cost. This is an addition to labor costs, where, with some other benefits, it properly belongs.

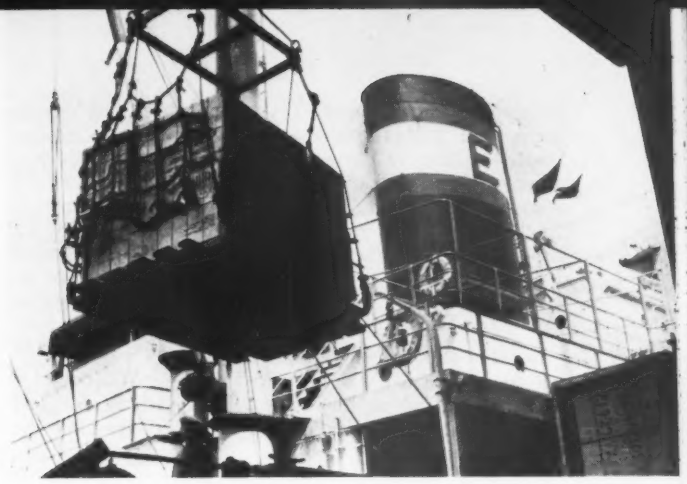
Parts Replacement Better and Cheaper

SOUTHERN California Gas Co. adopted a parts replacement program a year ago which not only provided improved service but also came near to the break-even point in the first year, compared to the previous year's deficit of $80,991.

Under this plan a definite predetermined installed price is quoted in advance of starting a job. The price includes the material at retail, labor and driving time priced at $3 per hour and sales tax. Labor times and a standard 20-minute driving time allowance were secured through time studies.

The Company's regular service trucks are stocked with 11 parts and are able to handle 40% of the replacements on the initial call. (In this case, the customer is not charged for driving time.) In addition to the regular trucks, they have 32 parts trucks stocked with 293 frequently-ordered items and which are available for the "call-back" orders.

Eliminate HIDDEN SHIPPING DAMAGE



Part of a $100,000 shipment of adding machines bound for Italy. New wire-bound containers cut damage and breakage to a minimum on these shipments. —*Courtesy Clary Multiplier Corp.*

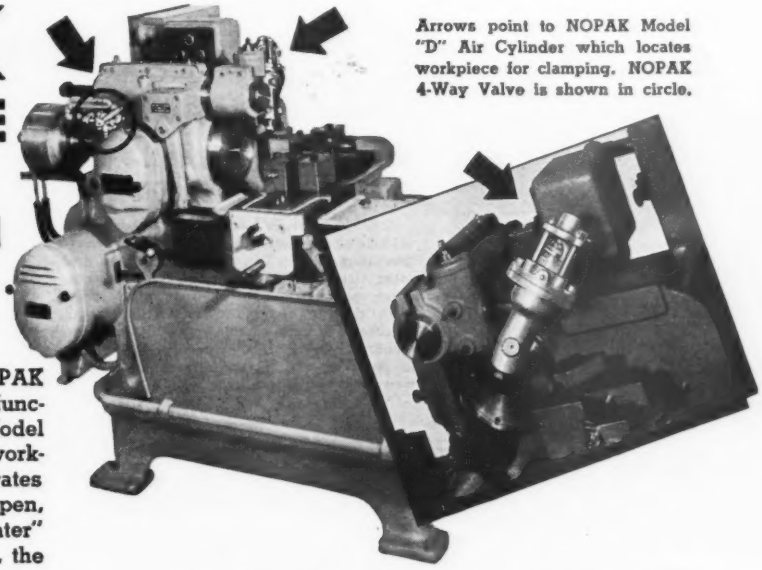
Delicate or sensitive equipment must be packed to resist rough handling and traffic shock

CRATING and shipping goods—particularly overseas, presents many problems to both the manufacturers and the transportation companies. Now, with a renewed urgency, export shipments are demanding refinements in procedure. Western manufacturers of sensitive instruments or delicate equipment may benefit from a recent experience of Clary Multiplier Corp., San Gabriel, Calif., manufacturers of an adding machine that contains more than 1,500 parts, precisely fitted and adjusted. Obviously, such a machine is particularly subject to damage by jarring and traffic shock.

A short while ago Clary was shipping to Italy and other countries, with an unpleasantly high incidence of damage and breakage of these machines. Investigation disclosed that containers appeared to be the major cause, and container specifications were changed. Lumber as heavy as ¾ in. was tried in the nailed boxes used for these shipments, but consignees continued to report hidden damage — even when the shipping boxes gave little evidence of breakage.

Since an adding machine is a precision product, most of the damage noted pertained to the shaking and jarring of gears and other parts, getting them out of line and requiring

NOPAK 4-WAY VALVE Controls Model "D" Cylinder and Air Operated Chuck on Sundstrand Lathe



Arrows point to NOPAK Model "D" Air Cylinder which locates workpiece for clamping. NOPAK 4-Way Valve is shown in circle.

In this lathe application, a ¼" NOPAK 4-Way Valve performs two vital functions. (1) It controls the NOPAK Model "D" Cylinder which locates the workpiece before clamping, and (2) it operates the air chuck. When the valve is open, the chuck is unclamped and the "locater" is down; when the valve is closed, the chuck is clamped and the "locater" is up.

This application of a NOPAK Valve and Cylinder is typical of many in the machine-tool field. It may suggest how you can use NOPAK products to improve the performance of machines or equipment you use in your plant, or build for others.

NOPAK ¼" 4-Way Hand Valve controls both air chuck and NOPAK Model "D" Air Cylinder.

GALLAND-HENNING MFG. CO.
2749 S. 31st Street, Milwaukee 46, Wis.
●
Write for Bulletin SW-1 or refer to Sweet's File for Product Designers.
●
Representatives in Principal Cities

NOPAK
VALVES AND CYLINDERS
DESIGNED for AIR and HYDRAULIC SERVICE
A 5938-½H-A

adjustment at destination. This alignment and maladjustment required costly repairs in remote locations where trained mechanics and technicians were difficult to obtain. But until the machines were restored to proper condition, they could not be used.

The Causes Are Hidden

Specific cause of this hidden damage in any case could be traced to heavy jarring, jolting, and transmitted shock from the rigid containers of the nailed crate variety.

Clary's engineering department began to experiment with lightweight prefabricated wirebound boxes. Working in cooperation with consultants from Martin Brothers Box Company in Whittier, a resilient wirebound box of special construction was designed with relation to the possible vulnerable points of the contents.

Boxes to Absorb Shock

Wirebound boxes are by their nature designed to absorb rather than to transmit shocks and jolts to their contents. They are constructed of thin veneer strongly stapled to resilient, continuous wire bands.

Shipments went out in the new containers, bound for Germany, Norway, Greece, and Italy. While awaiting results, the company analyzed costs—to find that (1) a minimum of 25% savings in crating time man-hours could be traced to the new container; (2) gross tonnage was considerably reduced; (3) container cost was lower; (4) handling and storage of the new containers before packing was considerably less of a problem.

Communications back to Clary from overseas consignees indicated that "little or no shock damage could be found."

furnished in
ANY SIZE
ANY ARRANGEMENT
. . . available in ready to ship widths of 32'-40'-50' and 60'

Modern LONG BEACH Plant of MASTIC TILE CORPORATION

. . . is 100% *Steeline*—all 50,000 square feet of it! Like so many other outstanding western manufacturers Mastic Tile simply adds more and more *Steeline* units to meet its ever increasing space requirements. In addition to possessing many superior design features *Steeline* is the quickest, and most reliable way to build a new plant or expand an existing one. *Steeline* is built in the West and is especially engineered for western industrial needs.

Preferred by Western Industry

Estimates furnished without obligation. Write or phone TODAY!

SS-174

Soulé Steeline TRADE MARK Buildings
100% clear span design • Rigid steel frame.
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ASK FOR BOOKLET
Illustrated 16-page booklet shows the unequalled adaptability of Steeline to special uses.

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Phone: BEacon 5155

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3010 First Avenue
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FABRICATORS OF STEEL BUILDING PRODUCTS SINCE 1911

Trucking Volume Shows Substantial Increase

NINE thousand tons of freight a day are trucked through Montalvo, just south of Ventura, on the Coast Highway between San Francisco and Los Angeles, judging by a recent road check made by the state highway patrol for the California Public Utilities Commission. In 48 hours 36,243,138 pounds were checked. Of this volume, 107,800 pounds (.029%) were being transported in violation of the California Motor Vehicle Act, or 42 overloads and one overwidth out of 3,428 vehicle units.

Comparison with a similar check at the same point exactly five years ago showed 2,497 units in 1946, or a gain of 37.3% in vehicles and 21.4% in freight transported.

Percentage of tonnage transported by classes of carriers this year was 40.5% to the certificated (common) carriers, 41.4% to the permitted (contract) carriers, 16.2% to proprietary carriers and 2.2% to interstate carriers. The increase in general commodity freight over 1946 shows that proprietary over-the-road operation of motor vehicles out of the Los Angeles metropolitan area gives a substantial threat to for-hire carriers for shorter distances. Proprietary carriers handled 50% of the total movement for distances of 100 miles, 31% for 200 miles, 9% for 300 miles and 1% for 400 miles.

The certificated or common carriers gained substantially in tonnage hauled over five years ago, while permitted or contract carriers declined. This change is attributed by Grant Malquist, senior engineer of the transportation department of the P.U.C., under whose direction the survey was carried out, to additional highway common carrier certificates between the San Francisco and Los Angeles areas recently granted.

INDUSTRIAL FILMS

The ABC of Internal Combustion

Title: "The ABC of Internal Combustion."

Subject: An animated motion picture explaining the basic principles of the internal combustion engine.

Supplementary information: 16mm. sound color film. No charge other than transportation.

Length: 13 minutes.

Available from: General Motors Corporation, 507 San Francisco Bank Bldg., 405 Montgomery Street, San Francisco 4, California.

Diesel

Title: "ABC of The Diesel Engine."

Subject: The fundamentals of the operation of a Diesel engine are explained in this animated film.

Supplementary information: 16mm. sound color film. No charge other than transportation.

Length: 20 minutes.

Available from: General Motors Corporation, 507 San Francisco Bank Bldg., 405 Montgomery Street, San Francisco 4, California.

California

Title: "California in the Century of the Pacific."

Subject: Comprehensive film on California, showing huge influx of population into the State during past decade, growth of industries, agriculture and power.

Length: 25 minutes.

Supplementary information: 16mm. sound color film. Schools may acquire prints on a permanent loan basis for showings before civic and social study classes on the junior high school and high school level.

Available from: Public Relations Dept., Golden State Company, Ltd., 425 Battery Street, San Francisco 11, California.

The Price of Freedom

Title: "The Price of Freedom."

Subject: A dramatic story of how we might lose our freedom and independence through indifference.

Supplementary information: 16mm. sound motion picture produced by the National Association of Manufacturers. No charge other than transportation.

Length: 23 minutes.

Available from: General Motors Corporation, 507 San Francisco Bank Bldg., 405 Montgomery Street, San Francisco 4, California.

Milk

Title: "They Bring Us Milk."

Subject: It is the story of the men behind the bottle of milk and other dairy products. It describes how specialists in a great variety of fields from chemicals to carburetors, from vanillas to veterinary, from soap to stainless steel, and many more must combine their skills to get the honored products of the cow to the consumer.

Length: 15 minutes.

Supplementary information: 16mm. sound color film. Schools may acquire this film on a permanent loan basis for grade school classes studying the dairy industry.

Available from: Public Relations Dept., Golden State Company, Ltd., 425 Battery Street, San Francisco 11, California.

LYNCH CORPORATION of Toledo, Ohio,
—a leading manufacturer of packaging machinery

—says

"This Lubricant Reduces Service Calls!"

MORPAC Model "T" and "K" combined print forming, wrapping and cartoning machine

The following quotation is taken from a letter we received from their Director of Sales:

"The majority of our machines are used in places where it is necessary to wash them with steam and hot water after each day's use. This naturally would remove any ordinary lubricant and trouble would develop if the machines were not immediately relubricated. With LUBRIPLATE it is different. There is always a film of LUBRIPLATE left on the machine after washing. This gives protection not only to moving parts, but also prevents general corrosion. The presence of salt and lactic acid in packing plants makes oxidation a hazard. LUBRIPLATE prevents this too.

"LUBRIPLATE greatly reduces unnecessary wear and prolongs the life of machines. It has reduced customer calls for service to a minimum. Our Service Engineers can readily spot machines that have had other than LUBRIPLATE Lubrication, as these machines do not give the service they should.

"After using LUBRIPLATE for over ten years, we are very well pleased with it and enthusiastically recommend it."

A LUBRICANT must be more than good to warrant such a recommendation. The Lynch Corporation, as well as hundreds of others who build machines to sell, not only use LUBRIPLATE Lubricants in their own shops, but also advise the buyers of the machines to always use LUBRIPLATE for re-lubrication.

LUBRIPLATE Lubricants are different from all other lubricants. They have properties all their own . . . they reduce friction and wear, prevent rust and corrosion and save power. They stay put under most adverse conditions and do not run out or wash away.

There is a LUBRIPLATE Lubricant that is just the right density for your requirements. Let us tell you about it. *Write today.*

LUBRIPLATE DIVISION
Fiske Brothers Refining Company
Newark 5, N. J. Toledo 5, Ohio

DEALERS EVERYWHERE—CONSULT YOUR CLASSIFIED TELEPHONE BOOK

LUBRIPLATE *THE MODERN LUBRICANT*

NEW MATERIALS & EQUIPMENT

FOR YOUR CONVENIENCE . . .
Use postage-paid card following page 74 to obtain further information on products described on these pages and literature listed on following pages . . .

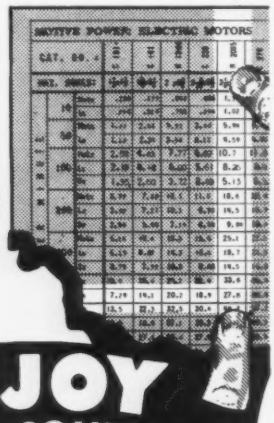
E-701

Hit-Kit Makes Hit

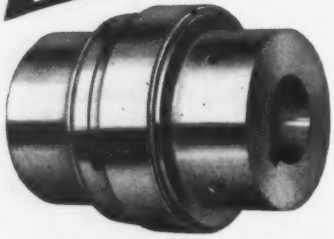
Features claimed: A precision-built portable resistance spot welder is now available for on-the-job repair of inconel and stainless steel foil and screen and for making alterations required by changes in design. Operation of this "hit-kit" is by trigger-type switch. By contacting both electrodes to foil surface and inducing current by operating trigger, foil is securely welded in place. Welder is equipped with leads nine ft. in length, attached to welding tips and operates on 110 AC. Power consumption is low, assuring economical operation. Complete outfit fits in a portable carrying case which consists of sheet steel box with lift-out tray and is equipped with a luggage type carrying handle. Box measures 20 x 10 x 8 in. and with welder and tools weighs 35 lb.

Available from: H. I. Thompson Company.

A BETTER WAY
TO FIGURE AND SELECT FLEXIBLE COUPLINGS... THE
LOVEJOY SELECTOR CHARTS
TELL YOU EXACTLY WHAT COUPLING YOU SHOULD USE!



LOVEJOY L-R FLEXIBLE COUPLINGS



are easy to install. No lubrication needed. No teardown for changing cushions.

WRITE FOR SELECTOR CHARTS

Local stocks in San Diego, Los Angeles, San Francisco, Portland and Seattle

LOVEJOY FLEXIBLE COUPLING CO.

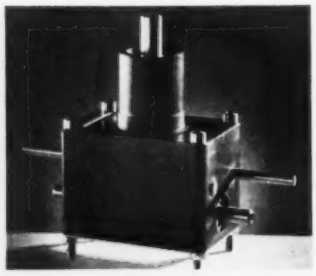
5092 W. LAKE ST. CHICAGO 44, ILLINOIS

Also mfrs. of Lovejoy Universal Joints and Lovejoy Variable Speed Transmissions

E-702

Adders' Delight

Features claimed: Ball and disk integrator is a component devised for use in analog computers and control systems. As a computing element it may be employed for generating derivatives, integrals, reciprocals, products, squares, exponentials and trigonometric functions. It is useful as a control element in closed loop servo systems and as a smoothing or averaging device for fluctuating data.

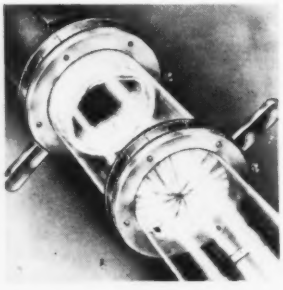


Available from: Librascope, Inc.

E-703

Not So Fast

Features claimed: A new type of valve for controlling flow of bulk materials from bins, hoppers and chutes in weighing, blending and packaging operations, and for free air control in heating, ventilating and drying, is now on the market. Its flexible diaphragm operates like an iris diaphragm of a camera, so that rotating the control lever increases or decreases opening of diaphragm and flow of material. Material passed through valve does not come into contact with any moving metal parts, thereby eliminating possible jamming and clogging. Valve can be attached to bin and hopper discharge openings, to supply chutes and ducts, and in air ducts.



Available from: Syntron Company.

E-704

Materials Handling News

Features claimed: These handidrive units make it possible to build a complete conveyor system. Units permit flexibility in design. A single conveyor, or a complete flow system, can be assembled with these various units. Belt, live roller and roller gravity conveyors are offered in five

standard widths—10½, 14½, 16½, 20½, 26½-in. between channel side rails. For many applications a system of handidrive units will give same efficient operation that heretofore required complete engineering design. Resulting layout, using these units, is comparable to a custom built job.

Available from: Standard Conveyor Company

E-705

Ladders Become Sure-Footed

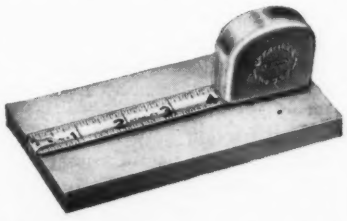
Features claimed: This hydraulic ladder-stabilizer is an adjustable steel attachment for lower end of straight or extension ladders. It provides safe footing for ladders in places where two legs would not be on same level and can be used on any surface regardless of contour. Hydra-Lizer assembly consists of two steel legs which act as plungers, in vertical tubes attached to lower ends of ladder rails. Each leg has a swiveled shoe attached to its lower end by a ball and socket joint. Each shoe, a hardened steel plate with a diameter of 3½ in. has a rubber and cord sole ⅜ in. thick vulcanized to it. Sole, with concentric circular grooves about ¾ in. deep, will serve as a gripper on most hard surfaces. Vertical tubes which house legs or plungers are cross-connected near their upper ends by steel telescoping valve tubes leading to a central valve block. Valve assembly adjusts to any ladder width between 17 and 29 in. and fits straight and base ladders. Entire assembly is filled with oil above plungers. Opening the valve permits oil to move from one side of system to other. When one leg moves up to adjust itself automatically to a difference in level, other leg moves down a corresponding distance.

Available from: Mine Safety Appliances Company.

E-706

Rules That Can't Be Broken

Features claimed: Added rigidity of these "pull-push" rules, No. 556 (6 ft.) and No. 558 (8 ft.) make them ideal for plumbers, carpenters, maintenance men. Nickel-plated. ⅝-in. blade has a special rust-resistant finish built up around graduations and numerals for maximum wear. Blade can be replaced quickly and safely. "D" shaped nickel-plated case with brushed satin finish is handy for inside measuring. Just read measurement at case opening and add two inches (width of case) for exact inside dimensions. Large black numerals and graduations are easy to read.



Available from: Stanley Tools.

E-707

The Eyes Have It

Features claimed: A new plastic cover lens reduces fogging and is more durable than regular glass and plastic cover lenses. Developed to protect more costly filter lenses from hot metal spatter and scratches, new lens is formed so that center portion is raised. Air space created between

IT'LL TAKE PLENTY OF FIGHT TO WIN THIS PRODUCTION BATTLE

Are your machines in top working order . . . ready for the long, tough production battle ahead? . . . fully protected against sudden failures? With delivery of new equipment often months in the future, you may soon find your old machines worth their weight in gold.

One of the easiest and surest ways to put new fight in your old equipment is to replace inferior or worn bearings with new, industry-proven Aetnas.

Tough, friction-free Aetnas are setting new standards for dependability plus reduction in power costs, maintenance and down-time in plants from coast-to-coast. Inevitably, the net results are substantial production boosts at less cost per unit.

Call your nearest Aetna distributor or write us today. It might be *your best protection* against the challenge that faces the machines you use or the machines you make.

AETNA BALL AND ROLLER BEARING COMPANY
4600 SCHUBERT AVENUE • CHICAGO 39, ILLINOIS

Aetna

Standard and Special Ball Thrust Bearings • Angular Contact Ball Bearings • Special Roller Bearings • Ball Retainers • Hardened and Ground Washers • Sleeves • Bushings • Miscellaneous Precision Parts

HYDRAULIC ACCURACY!

HYDROSCALE

WEIGHS AS YOU LIFT THE LOAD TO MOVE IT!

A rugged, compact crane scale that makes weighing routine where it has been impractical in the past. Eliminates the need for weighing stations and tie-ups of work, men and equipment.

Speeds up shipping, receiving, inventory. Weighs, measures, tests. Prevents equipment overloading. Incorporates many features such as tare adjustment, impact resistant glass.

Available with 25° tilt dial for high level reading and with portable storage stand.

Today's outstanding crane scale. Write for catalog.

Three Dial Sizes 12" 24" 30"

•

Models 500 to 100,000 Pound Capacity

HYDROWAY SCALES, INC.

20624 WEST 8 MILE ROAD · P. O. Box 4754 · DETROIT 19, MICH.

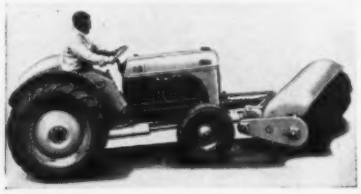
the two lenses automatically reduces fogging to a minimum. Use of fiber washers is unnecessary with this new construction. Lens will remain pitfree longer than glass and resists fusion of hot metals and spatter. Shock-absorbing acetate cushions upon impact and does not crack.

Available from: American Optical Company.

E-708

A Clean Sweep

Features claimed: Industrial plants, railroads, docks and terminals will find many applications for this new sweeper, designed for Ford tractors. Broom may be attached or removed in thirty minutes; all shafts are heavy duty and turn on ball bearings; finger tip power hydraulic control raises broom 8 in.; all moving parts are protected for operator safety; broom tilts to adjust itself to surface; a full length dust hood protects operator. Broom is driven by rear power take-off at fixed ratio to engine speed, providing efficient sweeping at all tractor travel speeds. Sweeps a 5 ft. swath at a 30 deg. angle, depositing debris outside of tractor wheels. Fibre or steel brushes are obtainable.

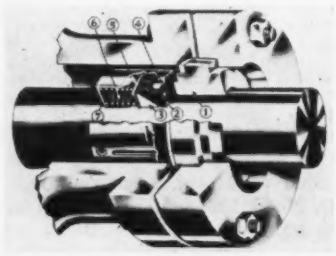


Available from: Meili-Blumberg Corp.

E-709

Teflon Seals Tight

Features claimed: Type 9 Seal incorporates a flexible ring molded from a new plastic, Teflon. Teflon has high heat resistance, low friction and chemical inertness. A set-screwed metal retainer (7) provides a positive drive from shaft to carbon sealing washer (2) through dents (4) which fit into washer notches. An effective seal between shaft and washer is insured by precision-machined Teflon wedge ring (3) which is pre-loaded by action of multiple springs (6). Spring pressure is uniformly distributed by a metal disc (5). Lapped raised face of rotation sealing washer (2) mates against highly lapped face of stationary seat (1) to provide a positive leakproof seal with minimum running friction between vertical faces. Spring pressure keeps face in constant contact providing automatic adjustment for wear and shaft end play.



Available from: Crane Packing Company.

E-710

Let Us Spray

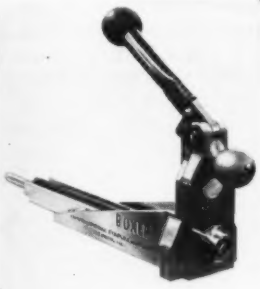
Features claimed: For simplified operation Bondwel flamespray equipment is designed without working parts. This corrosion protection equipment is furnished with interchangeable nozzles and dispensers for use with various fuel gas combinations and for application of various powdered materials, both metallic and organic. Bondwel flamespray gun is compact, has no moving parts. Material dispenser is of simple, sturdy construction, easily opened. Available in two sizes for light and heavy materials. Air filter, available in portable and stationary models, has an easy-to-replace filter cartridge, assuring ample supply of

clean dry air properly filtered for operation of gun and sprayer's mask. Furnished with regulator and gauge.

Available from: C. E. Freeman Co., Inc.

E-711

The "Boxer"



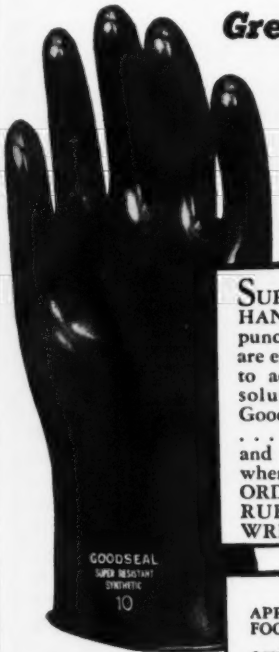
Features claimed: This portable staple machine weighs only 4 lbs., 2 oz. It operates on a retractable anvil principle — stapling filled corrugated or fibre cartons from outside. The "Boxer" features a new type of penetration control which adjusts depth of staple clinch and thereby makes sure that a carton's contents will not be disturbed or damaged by clinching operation. It also has a new adjustment for tightness of clinch itself.

Available from: International Staple & Machine Co.

E-712

Millinery Department

Features claimed: G-S 32 caps promote efficiency by keeping workers' hair out of moving machinery. They are washable, sturdy enough for continuous use, and inexpensive enough to be discarded. Caps are made from a material of processed vegetable fibre which will not dissolve in water or live steam, and are securely finished with an



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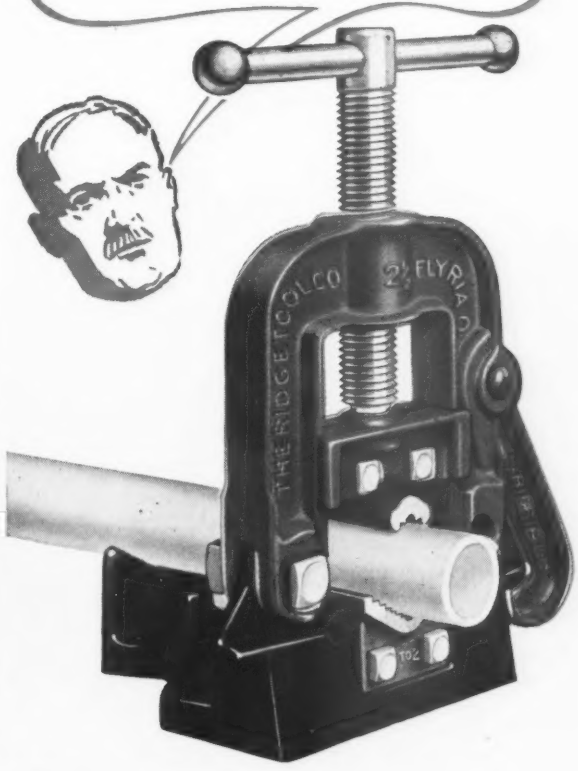
The Handy Durable RIDGID Bench Yoke Vise

It's got what you need for easy work



● You save time and effort with this more-for-your-money RIDGID Bench Vise. Right where you need 'em are its integral pipe rest and benders that won't flatten pipe—and heat-treated tool-steel LonGrip jaws mean you don't have to be so fussy with polished pipe. Special malleable frame, extra durable. 8 sizes to 6" pipe, bench, post, stand and Tristand models, yoke and chain. Order from your Supply House.

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Pacific Telephone

elastic to fit all head sizes. They can be auto claved, and sterilized in boiling water.

Available from: General Scientific Equipment Co.

E-713

That Clear-Eyed Look

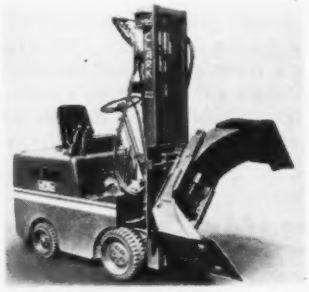
Features claimed: Recently developed is a new type of sweatband which keeps eyes cool and comfortable, keeps spectacles and goggles clear, increases efficiency and safety, and provides sanitary protection. This sweatband is produced by a special process from cotton-backed gauze expanded to about 8 times its normal thickness, making all its fibres "extra thirsty" to absorb perspiration fast. Super-soft and feather-light, no metal parts to rust or chafe, only pure cotton touches head. This simple, serviceable sweatband is strong enough to stand repeated rinsings and re-use, yet low enough in cost to be disposable.

Available from: General Scientific Equipment Co.

E-714

Rotating Roll Clamp

Features claimed: A rotating roll clamp attachment for fork trucks of 2,000 lb. capacity is designed to handle rolls of not over 1,500 lbs. on Clark "2024" models and not over 950 lbs. on Clark "2015" models. Unit can be rotated through 90 deg. so that a roll may be picked up from horizontal position and stood on end. It is rotated by a cylinder with chain and sprocket linkage, and is provided with positive stops at vertical and horizontal positions to eliminate excessive strains on rolls. Second clamp arm is hydraulically actuated and provides a maximum clamping force of 500 lbs. Clamp pads are hinge-mounted to fit against roll and exert maximum pressure over entire surface.

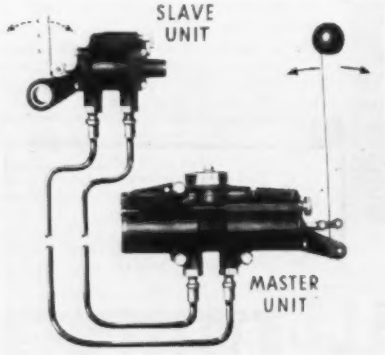


Available from: Clark Equipment Company, Industrial Truck Division.

E-715

Superdraulic Remote Control

Features claimed: This remote control system consists of a master unit and a slave unit interconnected by two small tubes. Motion applied to actuating lever of master units is accurately duplicated by slave unit lever. It has a positive load carrying ability in both directions because its operation is not dependent upon springs, compressed air or valves. A primary feature of this control system provides for expansion and contraction of both fluid and metal due to temperature changes in a manner that guarantees



synchronization between master and slave units. An automatic lock in slave lever provides irreversibility. Slave unit is also available without this locking feature. Either unit may be mounted stationary or movable and in any position without affecting the operation.

Available from: Superdraulic Corporation.

E-716

Recently Developed Bridge Ramp

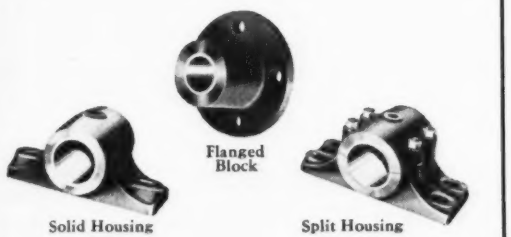
Features claimed: Scientific truss and bottom bracing for heavy duty operation and overload; flared side guard ends for tire and equipment protection; lifting and positioning stirrup which prevents swaying, and controls ramp during transportation on forks and in positioning; safety non-skid plate, crowned for dock height variations; positive locking device.

Available from: Roll-Rite Corporation.

E-717

Texad Replaces Steel Plate Casings

Features Claimed: Texad is a canvas covering for boilers and other industrial furnaces which not only replaces hard-to-get steel plate but improves furnace efficiency as well. Texad combines a plasticized synthetic resin emulsion, used as an adhesive, with strips of light-weight canvas. Covering seals unavoidable shrinkage cracks in finish coat



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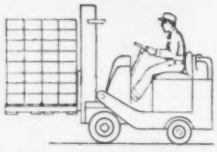

Install easily on all model fork lift trucks without design or wheel changes

Note these Features!

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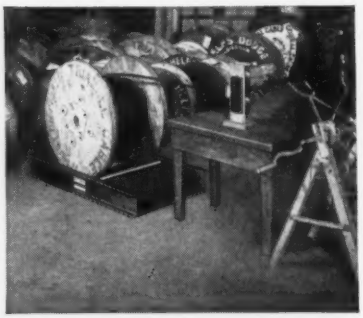
of insulating cement and acts as a safeguard against air leakage caused by insulation's own porosity. With Texad, outdoor boilers are completely protected against rain, snow and sleet. Inside buildings are made waterproof by Texad seal and can be washed down when desired. Texad dries to a bright, white finish. It can be left alone or painted with aluminum or colored paint.

Available from: Bigelow-Liptak Corporation.

E-718

Dolling Up

Features claimed: All steel reel dolly built in two sizes, featuring 2 ball-bearing mounted 5-in. steel rollers, supported in a heavy welded steel frame with built-in steel ramp for "roll on" loading. Reels require no spool-axle support but spin easily on free running rollers to pay out all types of material. Can be used with metering and rewind equipment. Front roll has locking pin and rear roll is adjustable to accommodate reels from 16 in. to 8 ft. diameter in both models. Model 1-S has 2-ton capacity, overall width of frame is 30¼ in.; length of rollers is 25 in. on a 1 in. steel shaft; weight is 208 lbs. Model 2-S has 4-ton capacity; overall width of frame is 46¼ in.; length of rollers is 41¼ in. on a 1¼-in. steel shaft; weight is 307 lbs.

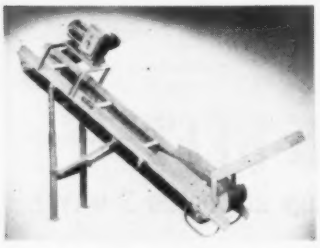


Available from: Metzgar Company.

E-719

New "Little Hustler"

Features claimed: Because it does not need to be bolted down, this new "Series S" conveyor can be moved readily when working areas or plant layouts change. Constructed of welded steel, this unit has been developed for economical handling of small metal parts such as stampings, castings, borings, turnings and clips. Available in five different lengths, "Series S" conveyor incorporates telescopic legs which permit discharge end to be raised or lowered as required. "Little Hustler" is available with belts 12, 18 or 24 inches wide. Standard belting is neoprene-impregnated fabric. It features positive trap and charging chute. For operations in congested areas, a special swivel charging chute can be attached to conveyor which permits feeding at any point within a 180 deg. radius.



Available from: May-Fran Engineering Co.

E-720

New Solder Equals Galvanizing Protection

Features claimed: Farco galvanizing wire solder restores damaged galvanizing. It will stand 800 hours of salt spray bath without deterioration. Solder shows no line of demarcation between it and hot dip, but makes a homogenous coat. It has a melting point only 17 deg. F. higher than

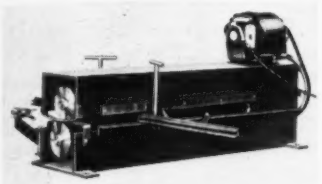
50/50 and has a high degree of fluidity. It can be applied successfully with torch or soldering iron and may be used with either Farrelloy's ASMC all metal or Mayolyte flux on steel, iron, brass, copper, galvanized and terne plate. Highly effective on underground connections, refrigerators, and ship's ventilators.

Available from: Farrelloy Company.

E-721

Portable Slitter Saves Time

Features claimed: This metal slitting machine reduces stand-by time, increases output, and cuts operating costs substantially. Machine handles 60 or 20 gauge mild steel, depending on model selected. Most popular applications are on sheets or coils for gutter, flashings, downspouts, flue pipe, skylight bars, strip stock for roll forming. It is possible to slit two or more sheets at a time when ripping lighter gauges. Twenty-seven inch throat depth permits cut to center of a four foot sheet—of any length. High grade steel cutting blades hold up indefinitely without sharpening.

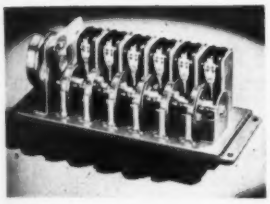


Available from: Wilder Manufacturing Company.

E-722

Industrial Hour Glass

Features claimed: This multi-cam recycling timer offers an easily-operated means for controlling industrial manufacturing and processing operations. Since all cams are mounted on a common shaft, a common time cycle is assured for all circuits. Each cam is independently adjustable for "on" and "off" electrical periods, and time cycles can be varied by substituting different size intermediate gears in drive.



Available from: Industrial Timer Corporation.

E-723

For Temperature Readings Any Time, Any Place

Features claimed: New thermometer Model 8689 has a corrosion-resistant stainless steel case claimed as the

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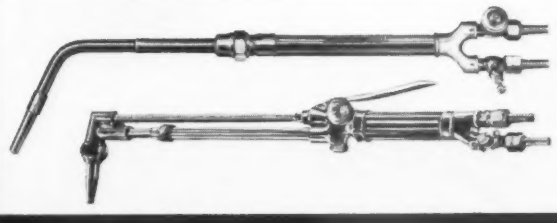

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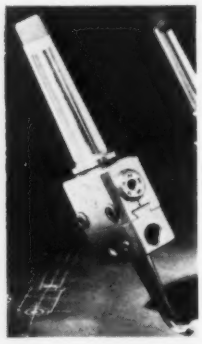
strongest of its type now available. Case permits use of accurate, all-purpose instrument outdoors and inside—in the heat of boiler rooms and cold of locker plants—without usual problems of deterioration. Thermometer is removable from case for easy replacement or for use of more than one of five different types with only one case. Types range from as low as -40 deg. F. to as high as 400 deg. F. Clear, easy readability is featured, and functional design assures no bending or warping.

Available from: Tagliabue Instruments Division, Weston Electrical Corporation.

E-724

Boring Head Assures Extreme Accuracy

Features claimed: Mustur Series 50 adjustable boring head is designed to handle both rough and finish operations on boring, milling and drilling machines as well as automatics. Small and compact, it can be inserted easily and positioned rapidly. Both body and block are made of heat-treated alloy tool steel. Tool block is dove-tailed into body and all fitting surfaces are ground to assure precision fit and long life. Adjusting head is graduated in 50 divisions to provide readings in thousandths, and tool body contains graduations to permit vernier readings of 0.0002 in. Constructed of tool steel, adjusting screw is hardened before threads are ground to assure maximum life and accuracy.



Available from: Maxwell Company.

E-725

Telejector

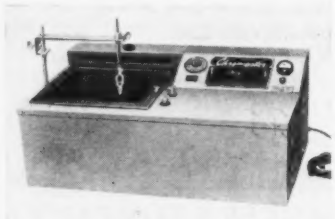
Features claimed: A 750 watt, 16-mm. motion picture projector with built-in right angle picture throw, and a fold-away screen comprise a portable audition-viewer, called "Telejector" which makes every office desktop a screening room for TV spots and shows. Screen is same size as picture tube of 12½ in. TV receiver and is masked to simulate exact effect of viewing in home. Space is provided in screen compartment for 1,200 ft. reel of 16-mm. film. Both screen and projector cases have luggage type carrying handles. Projector contains its own sound track amplifier and loudspeaker. Loudspeaker is supplied with an extension cord.

Available from: Audio & Video Products Corp.

E-727

Plating Unit Increases Tool Longevity

Features claimed: This Model A-50 Chromaster, combined with Chromasol solution, affords metal working and other industries with a new production tool for precision industrial hard chrome plating directly on cutting tools and wear parts. After only three minutes plating time, average life of cutting tools and wear parts can be increased 2 to 10 times. Unit is bench mounted, compact, self-contained and easy to operate. It has a capacity for hard chrome plating metal surfaces totaling 25 sq. in. max. at recommended current density of



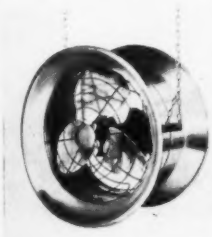
2 amps. per sq. in. It consists essentially of a built-in selenium retifier power supply, rectangular plating tank and instrument panel. Current control is by means of a continuously adjustable autotransformer.

Available from: Ward Leonard Electric Co.

E-726

Back in Circulation

Features claimed: An air circulator featuring suspended circulation where no power lines are on floor and do not come in contact with operator. These light weight circulators are overhead, allowing more free working area. New ventura design increases effectiveness and lowers noise level. Effective penetration is 20 to 80 ft., simply by adjusting angle of suspension.

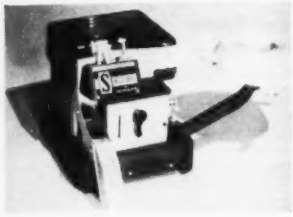


Available from: Jenn Air Products Company.

E-728

Write Your Own Ticket

Features claimed: This automatic ticket and label marker enables user to imprint more than 100 sizes and types of tickets, tags and labels, in his own plant. It can be quickly set to print exact number of tickets wanted, with all pertinent information. Available with new device for automatic consecutive or duplicate numbering, or with hand-set wheel for quick changing of data. Suitable for imprinting variables such as part number, stock number, material, price, date, etc. Tickets and labels designed for a wide range of applications such as product identification, stock control, and production control of clothing, electrical products, jewelry, textiles, plastics and various component parts.



Available from: Soabar Company.

E-729

Cutting Department

Features claimed: Now available is a compact, precision-engineered power saw, built to provide added utility and extra capacity for every cut with plenty of blade to spare. It cuts 2⅝ in. on a square cut and 45 deg. It cuts through

28 Years of Successful use in treating burns!
KEEP KIP HANDY
Easy spreading antiseptic ointment. Packed in tubes and tins. In liquid form, too—Kip Antiseptic Oil (with benzocaine).
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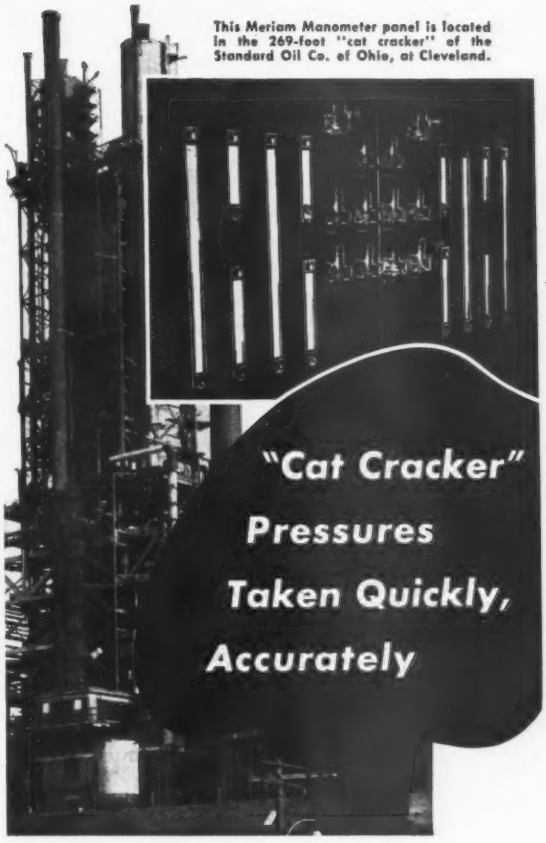
This Meriam Manometer panel is located in the 269-foot "cat cracker" of the Standard Oil Co. of Ohio, at Cleveland.
"Cat Cracker" Pressures Taken Quickly, Accurately

Some eighty feet up in a catalytic cracking unit, this outdoor instrument panel of Meriam Manometers measures the flow of catalysts and petroleum, and other differential pressures in the miles of pipe throughout this unit. By this method Sohio keeps a careful check on what takes place within the cracker.

Meriam Manometers are remarkably simple, yet thoroughly sensitive and accurate in their readings. With their Pyrex glass tubes and sturdy housings, these instruments minimize upkeep. They are widely used in plants and laboratories for measuring pressures, vacuums and differential pressures of practically all kinds of liquids and gases. Write us about your measuring problem.

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lumber 2-3/16 in. thick. It weighs 14 lbs. Saw has a sturdy frame of die-cast aluminum alloy. Motor is universal AC-DC., 115-120 volt special with a no-load speed of 4,600 rpm. Saw is equipped with a double pole, momentary contact switch with 100% overload capacity. Safety guard is of telescopic type with quick return. Standard equipment includes one 8 in. combination blade, wrench, fence guide and sturdy steel carrying case.

Available from: Cummins Portable Tools, Fred W. Wappat Div.

E-730

Industrial Vacuums Save Time

Features claimed: High performance industrial vacuum for operation on refrigerator assembly lines for cleaning dirt and loose insulation fibers from boxes. Vacuum has sealed motor with independent impeller for higher cooling efficiency and an abundance of power for thorough pickup. It is easily and quickly cleaned and maintained. It provides maximum portability around assembly lines. This vacuum cuts labor time by 50%.

Available from: Multi-Clean Products.

E-731

High Speed Recorder

Features claimed: Full-scale signals which vary as rapidly as 20 cycles a minute, as well as those with peak-to-peak amplitude of 10 per cent of scale which vary as rapidly as three cycles a second, can be recorded by a new electronic, high speed pen recorder. This device provides accurate recording in rocket engine testing where thrust of engine is measured with a strain gauge. It will be applicable for analyzing fuel efficiencies and engine designs, and for spectrographic and other analyses where relatively high scanning rates and narrow increments of change are encountered in a measured variable.

Available from: Minneapolis-Honeywell Regulator Co., Brown Instruments Division.

E-732

Housing Problem Solved

Features claimed: A new explosion-proof solenoid housing for use on Ross electrically operated pilot controlled valves. Cover, which can be used wherever fire and explosion hazards exist, is manufactured of cast-aluminum to Underwriters' Laboratory specifications. Provision is made for standard conduit connection. Explosion-proof solenoid cover may be used with ¼ in. to 1¼ in. size Ross pilot operated straight-way, three-way, four-way and four-way five-port models for single solenoid operation; this housing may also be used for double solenoid, momentary operation of Ross base mounted pilot controlled valves.

Available from: Ross Operating Valve Company.

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To keep belts in service longer, use only GENUINE Clipper Belt Hooks applied with Clipper Belt Lacers.
use Clipper Belt Hooks
Clipper Hooks are made of the finest quality wire—BETTER than ever before—produced for our exclusive use. Hooks hold with firm, sure grip—give longer satisfactory service.
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The Clipper No. 9 Portable Lacer laces belts up to 6 inches wide in one quick, easy operation. Under powerful pressure hook legs are embedded flush with the surface of the belt and points clinched, making a perfect joint. Phone your mill supply jobber for a demonstration!
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HELPFUL LITERATURE

for the plant operator who wants to keep informed

733-L

An Extra Head

Two heads are better than one in effecting low-cost, efficient handling of materials in your plant, points out *Burgin Associates, Inc.*, 3516 Geary Blvd., San Francisco, materials handling engineers and consultants. This firm offers free a concise pamphlet describing check points for solving materials handling problems, and what you can do to remedy them.

734-L

Durable Farm Buildings

Proper construction methods and practices for erecting durable farm buildings are reviewed in, "How to Build Farm Buildings That Last Longer," recently published booklet of *West Coast Lumbermen's Association*, 1410 S.W. Morrison Street, Portland, Oregon.

735-L

Measure Your Load

Hunter Spring Company, Lansdale, Pa., has for you a 4-page bulletin describing its Force Indicator, precision instrument for force measurement. Operation, types of loads measured, typical applications, accessories and use of six stainless steel attachments are covered in this booklet.

736-L

Fabricating Capacity Outlined

A. L. Smith Iron Company, Chelsea, Massachusetts, issues a 4-page folder describing that company's facilities and specialized abilities in fabrication of metal and assembly of electrical components. Copies are available without charge.

737-L

Gas Appliance Catalog

A new catalog by *Johnson Gas Appliance Company*, Cedar Rapids, Iowa, lists an entire line of burners, and furnaces for hardening, tempering and annealing valves, torches, mixers and blowers, manufactured by that company.

738-L

Split Case Centrifugal Pumps

Latest developments in its line of single stage, split case centrifugal pumps are covered in a new bulletin of *The Deming Company*, Salem, Ohio. A performance table in various colors simplifies selection of any individual unit to meet specific requirements for capacity and head.

739-L

Wrap It Up

Adolph Gottscho, Inc., Hillside, New Jersey, relates how a variety of nationally known producers of food, cosmetics, drugs, textiles, and other products imprint supplementary information on their packages automatically as an integral function of packaging operations. Imprints range from complete contents descriptions to code dates and include colors, sizes, flavors, and prices. Write for "A New Approach to Package Imprinting."

740-L

Getting a Charge Out of It

Truck fleet operators and industrial plants using large numbers of storage batteries will find of particular interest a new bulletin about Battery AD-X2, a chemical compound designed to decrease sulfation and increase life of storage batteries. Write *Jess M. Ritchie*, 2411 Grove St., Oakland, Calif., for a copy.

741-L

Watchbird Watching Washington

Seattle First National Bank, Seattle, Washington, sums up industrial growth in Washington for 1950 in an attractive, three-color booklet which gives a general outline of this state's development from a financial point of view.

742-L

Industrial De-duster

First issue of "Industrial Ventilation," dust and fume control periodical published by *American Wheelabrator & Equipment Corp.*, Mishawaka, Indiana, is now available. Bulletin contains illustrated case histories on application of Dustube cloth-tube filters to dust control problems in various industries.

743-L

"WeldOlets"

Bonney Forge & Tool Works, Allentown, Pa., distributes a two-color, 34-page catalog which contains illustrations of all its welding fittings, depicts typical installations and lists reducing size schedules for its WeldOlet butt welding line.

744-L

Tubing Steels

Condensed technical information for engineers confronted with problems involving design, fabrication and use of tubing in elevated temperature and high pressure applications is contained in a 6-page bulletin offered by *The Babcock & Wilcox Tube Company*, Beaver Falls, Pa.

745-L

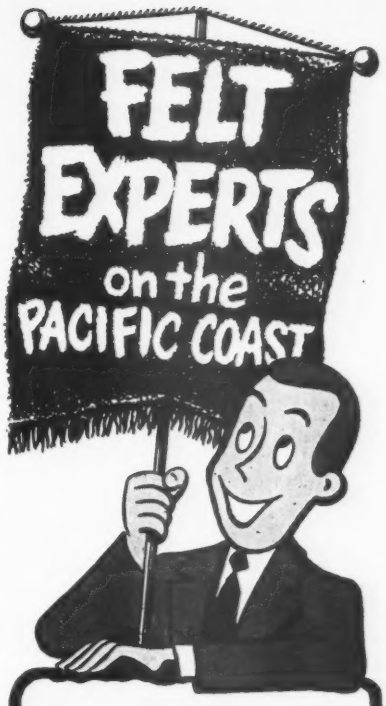
Strains for Happy Workers

"Muzak in Industry" is a just-published booklet based upon War Production Board findings during World War II as to requisites of functionally effective industrial music programs. *Muzak Corporation*, 229 Fourth Avenue, New York, will furnish copies.

746-L

Piping Info

To assist technicians in their design and application work, *A. M. Byers Company*, Pittsburgh, makes available a 4-page bulletin that contains most frequently required data on wrought iron pipe. Included are consolidated pipe tables for all sizes, dimen-



Our Pacific Coast Sales Agents, the A. B. Boyd Company, have a long and impressive record of service to felt users. They are fully qualified to collaborate with you on the application of felt to your products or processes. In addition, large stocks are maintained, making possible

IMMEDIATE DELIVERY

American Felts available include those listed in Armed Forces Specifications, which can be met exactly. The Boyd Company not only supplies American Felts in sheet and roll form, but also operates two skilled cutting shops, which produce cut parts to exact dimensions, ready for assembly.

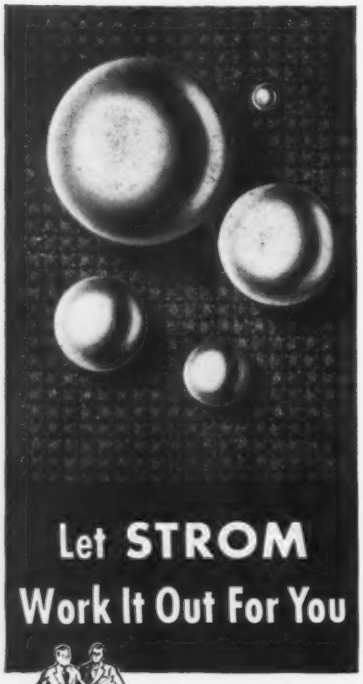
Consult the nearest of these Boyd Offices about your needs:

- 1235 HOWARD ST., SAN FRANCISCO 3, CALIF.
- 763 EAST 14th ST., LOS ANGELES 21, CALIF.
- 735 S. E. UNION AVE., PORTLAND 14, ORE.
- 404 DEXTER AVE., SEATTLE 9, WASH.

American Felt Company

TRADE MARK

a metal ball PROBLEM?



Whether it is a precision ball bearing or one of the other many ball applications in industry, your problem will not be entirely new. Strom has been in on many ball problems and knows the importance of the right ball for the job.

Strom has been making precision metal balls for over 25 years for all industry and can be a big help to you in selecting the right ball for any of your requirements. In size and spherical accuracy, perfection of surface, uniformity, and dependable physical quality, there's not a better ball made.

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Largest Independent and Exclusive Metal Ball Manufacturer

sional data for both standard and extra strong pipe, all official specifications for wrought iron pipe, chemical properties, general applications and special applications.

747-L

Round Holes and Square Timbers

"Permanent, Functional Industrial Buildings Through Engineering in Wood," published by *Timber Structures, Inc.*, Portland 8, Oregon, is a descriptive folder on use of glued laminated timbers such as beams, arches, trusses, girders, columns, craneways and rigid frames as well as other structural timbers.

748-L

Flexible Couplings Catalog

American Flexible Coupling Company, Erie, Pa., offers our readers a complete catalog on flexible couplings. Included are such topics as shaft sizes, effective horsepower to be transmitted, operating speed, space limitations, ordering information, installation, construction, and lubrication.

749-L

A Dutch Treat

"The Way America Works," a booklet released by *The Netherlands Information Service*, 10 Rockefeller Plaza, New York, gives an English translation and condensation of a report made to their unions by a group of Dutch trade unionists who visited the United States.

750-L

Dust Precipitators

American Blower Corp. makes available a catalog covering its dust precipitators, designed to handle fly ash, cinders and industrial dusts. Write that company, Detroit, Michigan, for a copy.

751-L

Who's Who in Trailers

Fruehauf Trailer Co., Detroit, Mich., is now distributing a catalog listing its complete line of 29 trailer types. This metal-bound, 8-color 1951 edition summarizes features and specifications for all Fruehauf models.

752-L

Ups and Downs

How a modern, high-speed elevator can be retarded and stopped level with floor in a distance of 20 inches—without over-running or discomfort to passengers—is explained non-technically in a leaflet now obtainable from *Westinghouse Electric Corp.*, Pittsburgh, Pa.

753-L

Welders' Guide

"The Welding of Stainless Steels" is a new handbook published by Electrode Division of *The McKay Co.*, Pittsburgh, Pa. Within its 48 pages are complete details of all phases of stainless steel arc welding, illustrated through convenient charts.

754-L

Precision Holding Tools

Erickson Tools, Division of Erickson Steel Company, Cleveland, Ohio, issues catalog "J," covering its line of precision holding tools. Book contains sections on precision

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GROUP INSURANCE SALES OFFICES IN PRINCIPAL WESTERN CITIES

collet chucks, adjustable and full-floating holders, precision tap chucks, air-operated speed chucks and air cylinders, precision expanding mandrels, speed indexers, and boring and reaming tools.

755-L

Precision Steel Equipment

Upon request, *Precision Equipment Co.*, 3714 N. Milwaukee Ave., Chicago, Ill., will send a two-color circular illustrating its steel shelving, waste receptacles, clothing lockers, storage cabinets and other steel equipment.

756-L

Punch Press Catalog

L & J Press Corporation, Sterling Ave., Elkhart, Ill., now offers literature on its open back inclinable presses. Detailed specifications and fully dimensioned diagrams of lower rams for all models are included.

757-L

Payloader

"Model HA Payloader—a fast, compact, bulk materials handling unit," pictures a tractor-shovel model, manufactured by *The Frank G. Hough Co.*, 889 Seventh St., Libertyville, Ill., and carries around two dozen application photos showing its various uses.

758-L

Paint Research Bulletin

"One Coat Paint Project: Eighth Quarterly Report," 222 pages, including photographs, graphs and tables, is now available from Library of Congress, Photo-duplication Service, Publication Board Project, Washington 25, D. C., at $8.00 in microfilm or $28.75 in photostat. Covers 2 years of research by Signal Corps, and discusses eight basic research topics.

759-L

Cooler

Patterson-Kelley Co., Inc., 461 Burson St., East Stroudsburg, Pa., publishes a catalog devoted to dry expansion freon or ammonia coolers, which should be valuable to those concerned with air conditioning, process, industrial and commercial refrigeration applications.

760-L

Jeep-sized Plant Locomotive

New techniques and savings in spotting, switching and hauling railway cars provide a picture story in *Whiting Corporation's* brochure on its Trackmobile, a jeep-sized plant locomotive. Copies are available from Whiting in Harvey, Ill.

761-L

Painting Fences

The "SkyBryte" Company, Cleveland, Ohio, explains characteristics of its aluminum paint, designed exclusively for chain line fences, in a bulletin recently released. Folder also describes Skybryte's two heat-resisting aluminum paints.

762-L

Right Hand Learns What Left Is Doing

A new booklet calling attention to Linedex, a new type of visible reference, is now available by writing to Management Controls Division, *Remington Rand, Inc.*, 315 4th Avenue, New York, Linedex is designed to furnish a accurate, fast and economical flow of such information as will expedite industrial and business transactions.

763-L

Removing Petroleum Vapor

"Selas Vape-Sorber" highlights characteristics of Vape-Sorber, a device for continuous removal of petroleum vapor from compressed air and other gases used for instruments or critical pneumatic operations. Write *Selas Corporation of America*, Erie Ave. and D St., Philadelphia, Pa.

764-L

Continuous Coating Equipment

A booklet by *Industrial Ovens, Inc.*, 13825 Triskett Road, Cleveland, Ohio, presents a practical exposition of advanced machine design elements involved in continuous coating equipment for such web materials as textiles, papers, films and foils, and strand materials such as wires, cables and synthetic monofilaments.

765-L

Lighting the Way

A new report, prepared as public service by *The National Terminal Tower, Cleveland Information Committee on Lighting*, summarizes present-day services of illumination in American industrial production, public safety, research, education and government. "Lighting and The Nation's Welfare" gives complete statistics on effects of lighting and contains comprehensive charts and graphs which illustrate important points of this study.

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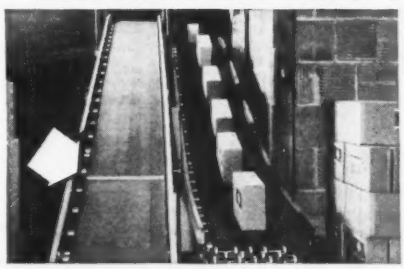
CONVEYOR BELT LACING



*Every Tooth A Vise**

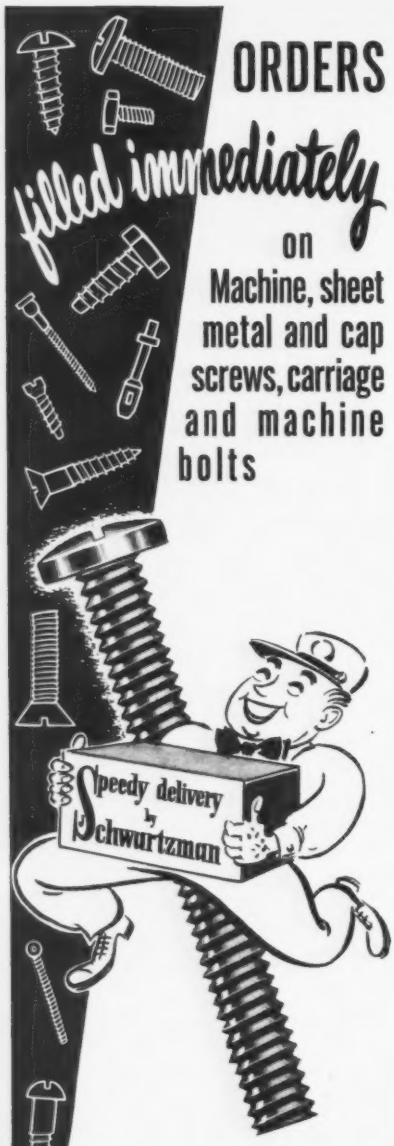
in Long Continuous Lengths for Conveyor Belts . . . . .

★ Excellent for Package Conveyors, Portable Loaders, Trenching and Ditching Machines, etc.
★ In canneries where corrosion or rust is a problem specify Alligator made of Monel.
★ For magnetic separators or anti-sparking specify Alligator made of Everdur.
★ Separable and smooth on both sides.
★ 12 sizes. For belts from 1/16" to 5/8" thick—and *any width*.

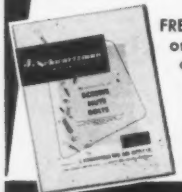
Order from Your Supply House. Ask for Bulletin A-60.

FLEXIBLE STEEL LACING CO. 4642 Lexington St., Chicago 44, Ill.

JUST A HAMMER TO APPLY IT



Every purchasing agent knows the importance of dependable sources for parts. Slow shipments cost time and money. Schwartzman concentrates on rapid, accurate fulfillment of all orders anywhere in the United States.



FREE catalog will be sent on standard items to make ordering easy. Consultation service available on "special" items.

A few choice territories still open for distributors.

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MFG. AND SUPPLY CO.

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READING GUIDE FOR WESTERN MANAGEMENT

A service for all management levels . . . current literature surveyed and appraised by the faculty of the School of Management, Golden Gate College

Monopoly and Free Enterprise

By George W. Stocking and Myron W. Watkins. The Twentieth Century Fund, New York, 1951, $4.00.

This is the third and final volume of a survey on the problems of monopoly, both national and international. The previous studies were *Cartels in Action* and *Cartels or Competition?* This concluding volume describes the present structure of the American economy, with emphasis on the relation of concentrations of economic power to the theory and practice of free enterprise.

Catalogues and Counters: A History of Sears, Roebuck and Company

By Boris Emmet and John E. Jeuck, University of Chicago Press, Chicago, $7.50.

A detailed study of how Sears, Roebuck and Company, in sixty years, grew from a small mail-order concern to the largest retailer of general merchandise in the United States. In telling the story, the authors analyze the policies which made Sears outstanding in the field of retailing.

Sources of Economic Information For Collective Bargaining

By Ernest Dale, American Management Association, New York, Research Report No. 17, 1950.

A comprehensive guide to sources needed in negotiating or determining wages, such as: sources and analysis of cost-of-living figures, productivity at job and industry level, comparative wage rates, "ability to pay." An impartial analysis is made as to the value and limitations of each type of data.

Military Inspection In Industry

National Industrial Conference Board, New York, Studies in Business Policy No. 50, 1951.

With defense production orders being issued in ever-increasing numbers, inspection procedures again assume importance. This report describes how the armed forces conduct inspection, the major sources of irritation between manufacturer and inspector, and the recommendations of both industry and military for solving these problems.

Company Group Insurance Plans

National Industrial Conference Board, New York, Studies in Personnel Policy No. 112, 1951.

Nearly 17 million persons are protected by group life insurance. Based on information received from 261 companies, this report presents an evaluation of group insurance, outlines the structure of group plans, and discusses the benefits provided.

Executive Compensation: Company Policies and Practices

American Management Association, New York, Financial Management Series, No. 97, 1951.

Includes: Incentive compensation for executives: Philosophy and practice. The bonus as an incentive in management motivation. Non-financial executive incentives: Retirement and security plan. How much should an executive be paid? The rearmament program and the American economy.

Developments in Office Personnel Administration

American Management Association, New York, Office Management Series, No. 127, 1951.

Includes: A supervisory training program that worked. Employee communications, a number one job: The General Motors story. The white collar worker in the American Economy. Defense production and the National economy. Economic mobilization challenges office management.

Marketing Research

By Ernest S. Bradford, McGraw-Hill, New York, 1951, $5.00.

In his discussion of the principles and procedures used in successful marketing research, the author covers an anlysis of products and services, the determination and the character and volume of consumer demand, and the channels available in bringing a product or service to the market. Emphasis is placed on acquiring and making an effective presentation of marketing data.

Industrial Pricing and Marketing Practices

By Alfred R. Oxenfeldt, Prentice-Hall, New York, 1951, $7.65.

In this analysis of modern pricing practices, the author describes the procedures used to estimate cost and demand, and discusses such marketing practices as advertising, quality competition, vertical integration, and merger, in connection with the determination of prices. Case studies are included on steel and whiskey prices.

Reviewed by
BERNA M. CARLSON
College Librarian.

THE WEST ON ITS WAY

ARIZONA

GM OASIS—General Motors Corp. purchases 2,280 acres of desert land 34 mi. southeast of Phoenix, near Williams Field. Tract will be known as General Motors Arizona Proving Ground and will be used for hot weather testing of cars, trucks and buses. It will also be used for development testing of military vehicles, including tanks, now being built by GM. Construction of roads, operations building and test facilities will begin immediately.

TUG GETS RADAR — Santa Fe Railroad's tug, "John R. Hayden," is now equipped with radar. Tug is part of Santa Fe's tug fleet transporting steel car barges between Ferry Point (Richmond), San Francisco and Marin counties.

CALIFORNIA

SHOPPING SPREE — Pacific Mutual Life Insurance Co. breaks ground for its new $1,500,000 Norwalk, Calif., shopping center. Norwalk Square will include 35 separate retail outlets, as well as a professional building.

FIRE BUG—Hoffman Radio Corp., Los Angeles, recently sustained an estimated $500,000 property loss from a fire of undetermined origin. Blaze started in quarters occupied by incoming inspection and quickly spread to administration offices in front of building. Stockroom was completely demolished. Fire was confined to two sections of the plant.

CONVAIR ADDS TOOLS — Consolidated Vultee Aircraft Corporation, San Diego, purchases $1,000,000 worth of new machine tools. Among items acquired is a Hufford 60-ton stretch-wrap forming machine, which is being used for precision forming for parts of the R3Y Navy turboprop cargo transport planes.

SOUTH CITY NEWCOMER—New location for Michel & Pfeffer Iron Works Inc., is southeast corner of S. Linden and Tanforan Avenues, South San Francisco, Calif.

HAPPY ENDING—Pacific Intermountain Express Co. commences construction of a motor freight terminal at Stockton. Terminal will be located at corner of Wilson Way and Bishop St. Terminal tract, comprising approximately 50,000 sq. ft., has frontage of 175 ft. on Wilson Way and 290 ft. on Bishop. Building will consist of an office section and freight dock.

FURNISHING ANAHEIM — Construction is begun in Anaheim on a new West Coast plant for Daystream Furniture Corporation of Fullerton. Building will occupy 10 acre site and will be a one floor, one building operation. Daystrom is world's largest producer of tubular chromed steel kitchen and dinette furniture.

HUSH HUSH—The Rosemead, Calif., airport is purchased for $900,000 by Fletcher Aviation Corp., Pasadena. A factory will be built on this site for manufacture of an unannounced military aircraft project. Fletcher will eventually move all its operations to this new location.

IT'S SANTA CLARA BY A NOSE—Santa Clara County's industrial activity continues its upward trend with three new industries and eight expansions representing a total capital investment of $606,500. This brings total new plant and expansion program figure to $16,896,500. Santa Clara Pottery Company, with approximately $95,000 capital investment, is largest new plant in county.

HOOKS AND EYES—Marman Products Co., Inc., Inglewood producer of fastening accessories and joining tubes in-

Marman's new Inglewood plant

itiates a new plant which will increase production by 300%. This plant, to be entirely separate from Marman's present facilities, will make possible duplicate tooling for all production items.

L.A. GETS LARGER CROWN—Plans to increase Crown Willamette Paper Co.'s Los Angeles facilities are under way. A new $2,000,000 plant with about 300,000 sq. ft. of floor space will be constructed. Old plant will probably be sold upon completion of new construction.

OIL'S WELL—Nearly 90 oil refinery projects throughout the country have been recommended for accelerated tax amortization by Petroleum Administration for Defense. Seven of these are basic refining facilities on the West Coast which have been recommended for 75% accelerated amortization. These firms and estimated costs are as follows: Rothchild Oil Co., Santa Fe Springs, $2,050,000; Union Oil Company, Oleum, $4,500,000; Union Oil Company, Los Angeles, $12,000,000; Fletcher Oil Co., Los Angeles, $175,250; Sunland Refining Corp., Fresno, $501,653; Standard Oil Co. of Calif., El Segundo, $7,460,000; Ben Hur Refining Corp., Long Beach, $2,240,000.

SOME LIKE IT COLD—Now completed is an 8,000 sq. ft. building for Calstrip Steel Corp., Los Angeles. Firm is installing three new annealing furnaces. This makes a total of five furnaces which will operate with controlled atmosphere and will increase Calstrip's annealing capacity 43%. A four-high cold reduction mill is soon to be installed which will increase rolling capacity about 25%.

A STANDARD LINE — Standard Oil Company of California plans a $1,000,000 addition to its Salt Lake City-Pasco pipe line and construction of two more pumping stations on this line, one at Juniper, Ida., and one at Baker, Ore. Expansion will boost pipe line capacity from 17,000 to 22,000 barrels per day.

FIVE TIMES FIVE—Menasco Manufacturing Co. lets contracts for construction of approximately 45,000 sq. ft. of additional manufacturing space at its Burbank plant. Project is final step in a $6,500,000 expansion program aimed at enabling Menasco to produce landing gear at a rate five times greater than pre-expansion pace. Employment is expected to rise from 725 employees to 1,400 by mid-1952.

SUDS FOR SACTO—Procter & Gamble Manufacturing Co. will erect a new manufacturing plant at Sacramento which will be large enough to accommodate an integrated factory for making company's full line of soap and special de-

Many times you wish

YOU HAD A POWER TRUCK TO HANDLE PALLETS IN SMALL SPACES

MAKE IT A REALITY WITH A MOTO-TRUC

The Shortest

Battery Operated Walkie Pallet Truck Built.

It is the shortest in over-all length, regardless of fork length, due to the most compact power unit.

It is the easiest to operate. Roller type handle has all controls.

Low level of battery mounting prevents tipping.

Exclusive braking system insures added safety.

Patented Nydegger shackles on load wheels for smooth travel over uneven surfaces.

12-volt power for ordinary service, higher voltage for ramp duty.

Capacity: 4,000 pounds.

SHORTIE MODEL ← 23¾" →

Write for Bulletin No. 51.

Representaties in all principal cities in United States and Canada.

The **MOTO-TRUC Co.**
1953 E. 59th Street
CLEVELAND 3, OHIO.
Originators and world's largest exclusive manufacturers of motorized, battery operated walkie type trucks

tergent products. Project will consist of a six-story processing building, a two-story building to house production departments and a warehouse.

COTTON COMPRESS—The Otto Goedecke firm of Halletsville, Texas, begins construction of a new cotton compress at Fresno. Plant, which has a capital investment of $400,000, is expected to be completed next fall.

NEW USE FOR RADIO STATION—McCormick Selph Associates, designers and manufacturers of glass-to-metal seals for guided-missile and other specialized applications, moves from Belmont, Calif., to new quarters on Embarcadero Road in Palo Alto. New plant, immediately adjacent to Palo Alto Airport, was formerly occupied by a radio broadcasting station.

New McCormick Selph plant at Palo Alto

GE KEEPS UP WITH WEST—Continued increase of West Coast facilities of General Electric Company's construction materials department is planned. Among GE's new facilities are a wire and cable plant in Oakland and a warehouse in Los Angeles. Western field staff is also being expanded.

KEEPING COOL — AiResearch Manufacturing Company, a division of The Garrett Corporation, Los Angeles, is slated to supply complete air conditioning and pressurization systems for first all-Canadian designed jet fighter, the AVRO Canada CF-100. Systems will incorporate 12 different items, including turbine refrigeration units, cabin pressure regulators, electronic temperature controls and numerous air and pressure control valves.

RYAN'S KEEPING BUSY — A multi-million dollar contract for production of gondola-like pods of Boeing KC-97 flying tankers, from which an operator controls a flying boom for mid-air refueling, is received by Ryan Aeronautical Company, San Diego. Ryan also receives new orders of more than $3,500,000 for jet engine components and exhaust systems. This latter group of orders is placed by such organizations as Ford Motor Company, General Electric, Continental, Westinghouse and Pratt & Whitney.

PATCH WORK—Largest single commitment in Pacific Airmotive Corporation's history for engine overhaul is received from Headquarters Air Materiel Command for complete overhaul of an undisclosed number of R-2800 engines. Engines are similar to those being used in B-26 attack bombers in Korean air drive.

WEBER TAKES TO AIR — Weber Showcase & Fixture Co. purchases Airquipment Co., subsidiary of Lockheed Aircraft Corp. Plant is renamed Weber Aircraft Corp., and carries on operation of Airquipment Co. and aircraft division of Weber company. Purchase adds 200,000 sq. ft. of floor space to Weber's facilities.

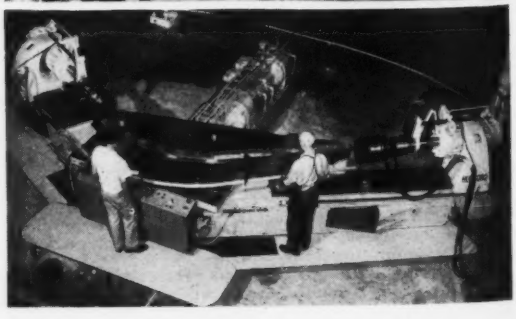
CALIFORNIA'S LEAR — Construction is commenced on a $400,000 factory and hangar for Lear, Inc.'s California division in Los Angeles. This 50,000 sq. ft. structure will at least double Lear's California capacity. Working force will be increased from 260 to 335.

DENTAL DEPARTURE—Plough, Inc., Memphis, Tenn., drug manufacturer, purchases August E. Drucker Co., San Francisco, makers of Revelation Tooth

WEST'S AIRCRAFT INDUSTRY IS HARD AT WORK

(for details see items on this and preceding page)

Gondola-like pods for Boeing KC-97 Flying Tankers being produced at Ryan Aeronautical Company.



New stretch-wrap forming machine recently installed at Convair's San Diego Division.

Powder. This product will henceforth be produced in Memphis. Drucker's San Francisco building at 2226 Bush St., will be used as a distribution branch for Plough.

DOUGLAS, DOUGLAS, EVERYWHERE—Southern California Homes, Inc., Bell, is purchased by Douglas Aircraft Co. for accommodation of Navy transport subassembly manufacture. Facilities consist of 57,000 sq. ft. of floor space and $200,000 worth of equipment. Douglas also embarks on a $16,000,000 expansion of its El Segundo plant. This sum will provide $8,000,000 worth of new equipment and increase plant's area by 1,000,000 sq. ft. Four types of Navy combat planes will be processed on assembly lines here, "AD Skyraider" and "F3D Skynight," already being assembled in El Segundo, and "F4D Skyray" and "A2D Skyshark" soon to be added.

COLORADO

MINERS ARE ALLOWED—Forty-one mining claims extending over 800 acres in the Long Park area of Montrose County, are leased to Vanadium Corp. of America by T. C. and Henry Brammeier and Associates, prospectors. This provides additional uranium-vanadium ore reserves for company's nearby Naturita mill.

IDAHO

CONVERSION IN WINNEMUCCA — Construction of a tungsten processing unit in the Rye Patch mining district is planned by Winnemucca Mountain Mines Co. Company's pilot mill will be converted to a 50 ton mill for installation of tungsten processing unit.

MONSANTO TO SODA SPRINGS—Monsanto Chemical Co. plans building a multi-million dollar elemental phosphorous plant two miles north of Soda Springs. New facilities will include an office building, laboratories, store rooms and a machine shop as well as a prefurnace processing plant and a furnace plant. When operating mill will employ about 100 workers and have an annual payroll of $500,000.

NEVADA

TUNGSTEN ORE AMONG THE GOLD—Donovan Mill in Silver City is being converted from gold processing to tungsten concentration of ore mined at Canadian-American's new open-pit operation east of Gardnerville. Estimated capacity of mill upon completion of reconversion work is between 100 and 150 tons a day.

MAJOR AND MINOR—The Colorado River Commission of Nevada acquires a major unit generator, N-7, at Hoover Dam power plant. Generator will be used for servicing of electrical energy to lessees at state-owned Basic Magnesium plant near Henderson. Nevada also takes possession of a minor unit generator, A-9, at Hoover. This generated power will be used by private power companies.

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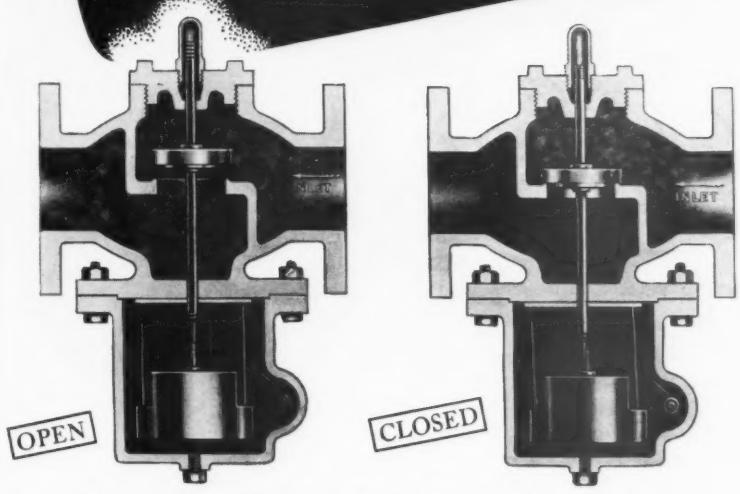

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MANGANESE TO MARKET — Some 1,200 tons of manganese ore per day are to be processed at Manganese, Inc.'s $2,500,000 plant now under construction in Boulder City. Company will haul raw ore to Boulder City from its holdings of approximately 70 claims. Plant will utilize a modern flotation system, and some 250 men will be employed. Manganese, Inc., is having built two rotary kilns, said to be largest ever engineered and manufactured west of the Mississippi. Kilns, 10 ft. in diameter by 150 ft. long, will be installed as part of the $2,500,000 manganese ore plant at site of old Three Kids mine near Henderson. Kilns involve approximately 400 tons of steel, and will be driven by electric motor gear reducer drives.

OREGON

AERONAUTICAL ADDITIONS—Two new airlines are authorized by Civil Aeronautics Board to operate on scheduled flights between Alaska and United States. Pacific Northern Airlines operates between Anchorage and co-terminal points, Portland and Seattle. Intermediate stops are Junea, Yakutat and Cordova. Alaska Airlines operates between Fairbanks and Portland and Seattle.

WEYERHAEUSER LOGS AGAIN — Weyerhaeuser Timber Co. begins operations of a new sawmill at North Bend. At full capacity mill will produce about 300,000 board ft. each eight-hour shift. Weyerhaeuser's 205,000 acre Millicoma tree farm supplies logs for North Bend operation. Weyerhaeuser also plans a new plywood plant at Springfield. Million dollar facility will produce an estimated 3,000,000 sq. ft. monthly, with logs coming from concern's nearby tree farms.

WASHINGTON

OVEN OPERATIONS — An additional oil-fired ring type carbon baking furnace is being built by Aluminum Co. of America at its Vancouver reduction plant. This furnace, costing $1,000,000, will have an annual capacity of 25,000 tons of finished electrodes. It will be same size as two existing furnaces, erected in 1940, but with up-to-date improvements.

ROLLING ITS OWN—Seidelhuber Iron & Bronze Work, Inc., begins construction of a rolling mill unit that will cost about $1,000,000 and employ 300 men when completed. Mill is scheduled to produce 4,500 tons of rolled strip and sheet a month when placed in full operation.

THE PARCHMENT WORLD—Pacific Coast Paper Mills plans construction of a $500,000 building at its Bellingham plant to house its converting process. New structure, measuring 80 ft. by 315 ft., will be two stories high and will be equipped with machinery designed for more efficient operations.

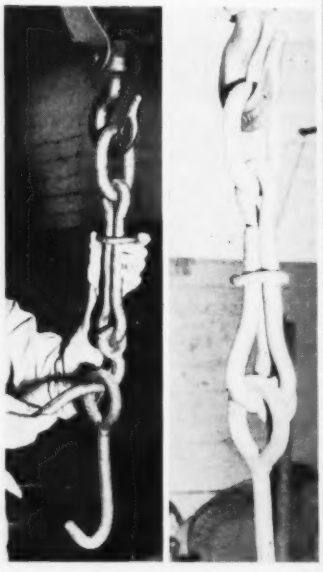
POTLINE PREDICTIONS—Kaiser Aluminum & Chemical Corp. hopes to install another potline (its eighth) at Mead aluminum reduction plant north of Spokane. It would cost approximately $5,000,000. If Kaiser succeeds in obtaining power from Bonneville Power Administration on an "interruptable" basis, company will set up new potline to boost production by another 20,000 tons of pig aluminum a year. By operating on a 24-hour basis, Mead is now turning out 150,000 tons of this light metal annually.

CAMAS GETS CERTIFICATE — Defense Production Administration issues a Certificate of Necessity for a $19,794,450 expansion of Crown Zellerbach Corporation's Camas plant. Sixty-five per cent of this amount is to be used for fast amortization by DPA.

Safety Link Designed For Heat Treating Operations

ALTHOUGH this safety link was originally designed for use in a heat treat operation, it could well be of value to plant men in many other instances—for example, where mechanized equipment is either pulling or suspending objects.

Western Gear Co., Seattle, Wash., developed this as a special purpose tool for safety in an emergency. "What would happen," the engineers asked themselves, "if the power failed at just the time a batch of red hot gears were being lowered into the oil quench tank?"



LEFT: Safety link in open position (as it would be for dropping load into heat treat oil).
RIGHT: Safety link in locked position.

A serious fire might result, unless the gears could be plunged immediately beneath the surface of the oil. Some sort of emergency release seemed to be the only way to solve this problem, so they went to work and designed this special link to fit between the crane hook and the hook that holds the pieces to be quenched.

Now, in case of emergency, the release ring is lifted and the load is dropped into the quenching oil.

WESTERNERS AT WORK

Arizona

ROGER I. C. MANNING, field engineer for *Arizona Department of Mineral Resources*, succeeds CHARLES H. DUNNING as director of this department. Dunning retires to enter private business.

Phelps Dodge Corporation, Douglas, names WALTER C. LAWSON as assistant to vice president and general manager. J. B. PULLEN becomes manager of company's New Cornelia branch at Ajo, and CARL E. MILLS takes over as manager of Copper Queen branch at Bisbee.

A. P. MORRIS, former assistant to general manager, Ray Division, *Kennecott Copper Corporation*, at Ray, advances to position of general manager, succeeding R. W. THOMAS who retires. JAMES L. STEVENS, former assistant mill superintendent for Kennecott at Hayden, becomes mill superintendent, replacing FRANK J. TUCK, also retiring.

California

Extruders, Inc., Culver City, appoints ROBERT C. RAAB as manager of aircraft products division to direct national sales of electrical insulation, tubing, custom extrusions and aircraft electrical wire.

General Petroleum Corporation, Los Angeles, advances LEO A. CASTLER to project engineer in engineering department. Castler joined GP in 1943 as a senior draftsman.

PAUL DIEFENDERFER is in charge of manufacturing in *Harnischfeger Corporation's* new Pacific Division headquarters, Los Angeles; and RICHARD GREEN is chief engineer.

New director of engineering for *Hoffman Radio Corp.*, Los Angeles is CARL WASMANSDORFF. He was director of development engineering prior to this advancement.

STUART A. MITCHELL, manager of manufactured products division, *Golden State Company, Ltd.*, assumes additional duties of manager of northern California division. He succeeds JACK E. WALDIE, deceased.

H. E. WAGNER joins *Angelus Engineering Corporation* as chief engineer. Wagner's previous experience includes five years with *Link Belt Company*, Los Angeles, as engineer and designer, and eight years as vice president and engineer of *CraneVeyor Corporation*, Los Angeles.

Wagner

Knight

RALPH E. KNIGHT, assistant general manager in charge of Chemical Division of *Kaiser Aluminum & Chemical Corporation*, is named to two additional positions—vice president of *Kaiser Magnesium Company* and vice president of *Kaiser Bauxite Company*.

New administrative staff assistant for *American Electroneering Corp.*, Los Angeles, is KARL DAVID BREITIGAN, previously connected with *Aerojet Corporation*, Azuza.

Richfield Oil Corp. elects RICHARD D. MONTGOMERY, former manager of exploitation department, to vice president.

New officers for *U. S. Spring & Bumper Co.*, Los Angeles, are as follows: treasurer-secretary, HOWARD R. SMITH; comptroller-assistant secretary, E. J. JAMISON; assistant secretary, LOYD WRIGHT.

Bennett

C. G. BENNETT joins *Pacific Coast Foil Co.*, San Francisco, as director of product development and consumer research. He is a former manager of coating and laminating activities for *Paterson Pacific Parchment Company*, and originator of "Benband," a heat-sealed vegetable wrap, as well as other packaging innovations.

New branch manager of *Monsanto Chemical Co.'s* Western Division special products department is L. W. MILLER. W. P. WILLIS, JR., formerly Los Angeles branch manager, is new Santa Clara plant manager.

Rohr Aircraft Corporation, San Diego, names EDWARD T. AUSTIN, editor-in-chief of *Union Tribune*, as public relations director.

R. G. RUNYAN, purchasing agent for *Oliver United Filters, Inc.*, moves his office to company headquarters in Oakland.

Hiller Helicopters appoints FRANK A. LEARMAN, San Diego, executive vice president and general manager. Learman was formerly vice president of *Consolidated Vultee*. W. D. HOLMAN, former chief of materials for *Convair's* Fort Worth division, joins Hiller as materials manager.

Flying Tiger Line, Inc., Burbank, names W. J. DUEHREN general foreman of lines maintenance for both domestic and international operations; and B. E. Replogle, Detroit station manager, is promoted to assistant superintendent of stations.

C. F. LAUSTEN, former manager of manufacture, Pacific Division, *American Can Company*, moves up to assistant general manager of manufacture; and A. T. AUGENSEN, presently assistant manager of manufacture, Pacific Division, takes over Lausten's former duties.

Following are changes in personnel at *Lockheed Aircraft Corporation:* G. A. FITZPATRICK, works manager, becomes production manager; C. S. WAGNER is now manufacturing engineer; STEVEN N. BEAN succeeds Wagner as chief tool engineer; RALPH J. SWONK advances to plant engineer; E. H. FARMER, plant engineer, is promoted to manager of manufacturing control; WILLIAM SHULVER, JR., head of material and traffic is new director of materiel; R. W. RUBIDGE, chief industrial engineer, is serving in a staff capacity under BURT C. MONESMITH, manufacturing manager.

DR. CHARLES A. REILLY, is now a research chemist with *Shell Development Company*, Emeryville. Dr. Reilly comes to Shell from the faculty of Dalhousie University, Halifax, Nova Scotia.

L. T. WOLD is elected vice president of *Dresser Equipment Co.*, and is also named general manager of Dresser's *Kobe, Inc.*, Division, Huntington Park. Wold joined Kobe in 1946 as controller.

ARTHUR F. DAVIS is district manager for new Sacramento office of U. S. Department of Commerce.

New assistant manager of Gummed Tape Division, *Western Waxed Paper Company*, San Leandro, is BILL MURRAY, a former salesman for this firm. JACK HAVENS, lately of *Zellerbach Paper Co.*, Oakland, replaces Murray.

RUSSELL J. LOVE, vice president and chief engineer of *Standard Steel Corporation*, Los Angeles, resigns.

JAMES F. SWEATT, manager of *The B. F. Goodrich Company* tire plant at Oaks, Pa., since 1943, is named manager of company's Los Angeles tire plant.

Sweatt

Bayer

Helicopter Division of McCulloch Motors Corporation, Los Angeles, appoints AL BAYER as director of flight and service.

ALEXANDER GABAY is now assistant to president of *Wooldridge Manufacturing Co.*, Sunnyvale.

NORMAN R. MCKEE, formerly vice president, *Southern Gas Company of California*, is elected president of *James H. Knapp Company*, Los Angeles, succeding JAMES H. KNAPP, deceased.

Libby, McNeill & Libby ups GEORGE E. MCDEARMID to vice president in charge of Pacific Coast operation, succeeding LEROY J. TAYLOR, retired.

At annual meeting of *Oil Producers Agency of California*, D. T. STAPLES was designated president, replacing L. A. CRANSTON who has held that office during the past three years.

ELMO E. FERRARI, director of Port of Stockton, accepts position of Director, Port Facilities, Defense Transportation Admin-

istration, Washington, D. C. During his absence GEORGE T. HENCH, executive assistant to port director, takes over port operations.

Western Gear Works promotes WILLIAM E. HOARD to position of manager of its Belmont plant, and RAY CONLISK is upped to

New Western Gear officials: Upper left, *William E. Hoard;* upper right, *Ray Conlisk;* left, *Warren Carhart.*

supervisor of application engineering department at *Pacific Gear & Tool Works,* San Francisco subsidiary of Western Gear. WARREN CARHART is new supervisor of application engineering at the Lynwood plant.

L. S. BARKSDALE, president of *Barksdale Valves,* resigns as vice president of *W. R. Whittiker Co.,* and general manager of Saval division, in order to devote full time to Barksdale Valves. M. C. NELSON is promoted from chief engineer to general manager of this company.

Aircraft Engineering & Maintenance Co., Oakland, names ORVIS M. NELSON president, succeeding RAY T. ELSMORE, resigned. SHERWOOD A. NICHOLS becomes executive vice president; DOUGLASS F. JOHNSON, administrative vice president and treasurer; and ROBERT E. HILLIARD, controller.

Heading up *Carnation Company's* new industrial relations department is E. H. HALGREN, company secretary.

E. E. HARDESTY becomes manager of *Narmco, Inc.'s* San Diego factory. Hardesty was associated with *Dumont Corporation,* San Francisco prior to joining this company.

WALTER K. PALMER becomes assistant controller and director of cost control for *Kaiser Steel Corporation,* Oakland; and GUSTAV E. LOWE is advanced to manager of rate repartment in general traffic office of *Kaiser Aluminum & Chemical Corporation,* also in Oakland.

Colorado

C. J. NASSIMBENE, Denver, becomes research and development engineer for *Pacific Intermountain Express Company.* Nassimbene is a former production manager for *Sachs-Lawler* at Denver, and was associated with *Boeing Aircraft Co.,* as senior flight test engineer during World War II.

DEL YARBERRY is named general foreman of *Colorado Fuel & Iron Corporation,* Pueblo. New wire mill engineer at Pueblo for CF&I is W. C. HEASLIP, former senior development engineer for *Carborundum Company,* Niagara Falls, New York.

Idaho

R. W. WITHERSPOON, Spokane attorney and banker, is elected president and general manager of *Hecla Mining Company,* succeeding L. E. HANLEY.

Silver Summit Mining Company names RALPH W. NEYMAN as manager and vice president.

Nevada

S. W. SMITH is promoted from mine superintendent to general superintendent of mines, Nevada Mines Division, *Kennecott Copper Corp.*

JULIAN MOORE now is manager of *Basic Magnesium Plant* at Henderson, and DOX ASHBAUGH is named secretary of Nevada-Colorado River Commision which controls Basic.

New Mexico

Recent personnel changes for *Atomic Energy Commission, Santa Fe Operations Office,* related to future transfer of weapons program's headquarters office to Albuquerque and establishment of Los Alamos Field Office are as follows: GEORGE P. KRAKER, Sandia Field manager, Albuquerque, is appointed deputy manager, Santa Fe Operations. DANIEL F. WORTH, JR., Kraker's as-

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sistant, is promoted to manager of Sandia Field. ELMO R. MORGAN, former assistant to manager of Santa Fe Operations and director of Los Alamos Community management, is advanced to manager of Los Alamos Field Office.

Oregon

NORMAN J. JOHNSON, assistant treasurer, *Griffith Rubber Mills*, Portland, is appointed to nation's Rubber Industry Advisory Committee.

A. J. MYERS, is named general superintendent of plywood manufacture for *The Long-Bell Lumber Company*. Myers, who has been superintendent of plywood operation at Long-Bell's Weed, California Division, will headquarter in Gardiner.

Gathered together for 40th anniversary of Fisher Flouring Mills Company, Seattle, are (left to right) *Dewey Robbins*, milling superintendent; *Wm. L. Haley*, production and products control; *J. S. Davis*, vice president and sales manager; *J. L. Locke*, president and general manager; *O. D. Fisher*, president.

Emmit Aston, Biles-Coleman Lumber Company, Omak, Wash., left; and *L. G. Olson*, manager White River Branch, *Weyerhaeuser Timber Company*, right, compare their new hand-painted "Keep Washington Green" neckties with Wash-

ington State Forester *Bernard Orell's*. A dozen of these ties were presented to officials at the Governor's Annual Keep Washington Green Meeting, by *Juanita R. Gallaher*, editor and publisher of *Western States Reclamation Journal*.

Washington

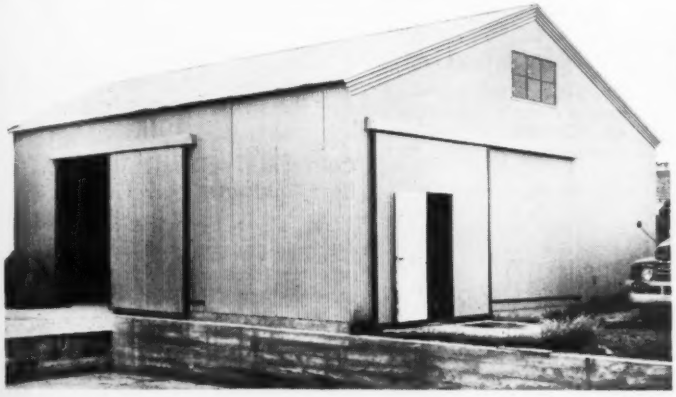
PRESLEY LANCASTER, manager of economic mobilization plan for *Seattle Chamber of Commerce* is called to Washington, D. C., by National Security Resources Board to assist in the national program. He is succeeded by BILL GOLDEN, Seattle newsman.

J. ARTHUR OLMER, former instructor at University of Washington and Seattle University, replaces KEN WADLEIGH as training supervisor for *Boeing Airplane Company's* Seattle Division. Wadleigh is recalled to active duty with the Air Force. BERNARD BALDWIN is appointed to newly-created position of personnel technician.

ROLLIN DAY upped from quality control head of *Cedergreen Frozen Pack Corp.*, Bellingham, to production manager at Wenatchee.

Commercial Ship Repair, Seattle, appoints WILLIAM W. GILMORE, general superintendent in charge of all outside production.

Kennametal, Inc., Latrobe, Pa., appoints WILLIAM M. STOLL as mining engineer, with duties of locating and procuring minerals that constitute basic materials esential for



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production of cemented carbides used in tools for metal-working and mining. Stoll's activities will be largely in the Western states, and he will headquarter at Seattle.

C. S. THAYER, currently serving in ALCOA's smelting and fabricating operations, Vancouver, is named manager of

Farquhar

Thayer

Aluminum Company of America's Northwest operations. W. N. FARQUHAR is named works manager of Alcoa's new aluminum smelting plant to be built at Wenatchee.

CHARLES L. WHEELER, JR., becomes works manager for *Pacific Northwest Alloys, Inc.*, in their new magnesium operation at Spokane. He is the son of CHARLES L. WHEELER, of San Francisco, executive vice-president of *Pope & Talbot, Inc.*, lumber and steamship operators, was a glider instructor during the war and subsequently was co-ordinator of sub-contractors for *Parker, Steffens and Pearce*, industrial contractors in San Francisco. *Pacific Northwest Alloys, Inc.*, has been named as operating contractor of the plant and *Morrison-Knudsen* as rehabilitation contractor.

ASSOCIATIONS ELECT

Western Highway Institute: regional vice presidents, Los Angeles, NEILL CURRY, *California Cartage Co;* Salt Lake City, REX SHEPARD, *Utah-Arizona Freight Lines.*

American Society of Mechanical Engineers: chairman, HAROLD A. JOHNSON, University of California; vice-chairman, TEMPLE S. VOORHEIS, *Coen Company;* secretary-treasurer, ERIC A. SALO, *Pacific Gas and Electric Co.*

Holbrook

Gypsum Association: Second vice president, *James E. Holbrook* (left), vice president, *Pabco Products, Inc.*, San Francisco.

Society for Advancement of Management, San Francisco Bay Chapter: president, A. R. BAILEY, vice president, *Coast Counties Gas & Electric Co.;* national director, PAUL ELIEL, industrial relations and management consultant; vice president (program), DOUGLAS WATSON, associate manager, *McKinsey & Co.;* vice president (membership) W. R. WILLARD, director of organizational planning, *Columbia Steel;* secretary, H. L. HILLEARY, executive office staff, *Standard Oil Company of California;* assistant secretary, M. E. NELSON, administrator, *Public Utility Employers Institute;* treasurer, DAVID M. SCOVILLE, president, *Pacific Carbon and Ribbon Manufacturing Co.*

National Association of Cost Accountants, San Francisco Chapter: president ROGER RUSH, *UARCO, Inc.;* first vice-president, RALPH B. KNOTT, *Fibreboard Products, Inc.;* second vice-president, HEROLD H. NEHLS, *Independent Iron Works;* treasurer, JOHN N. VEALE, *Remington-Rand, Inc.;* secretary, EILEEN LEPPERT, *State of California.*

CORRECTION. *National Association of Purchasing Agents:* vice president, District No. 1, H. W. CHRISTENSEN, Columbia Steel *Corp.* (Mr. Christensen was identified as president of this association in our June issue.) District No. 1 includes purchasing agents' associations in British Columbia, Washington, Oregon, California, Utah and Hawaiian Islands.

Christensen

Caples

American Zinc Institute: president, RUSSEL B. CAPLES, manager *Anaconda Copper Mining Company*, Great Falls, Montana operations.

Douglas Fir Plywood Association: president, B. V. HANCOCK, executive vice president, *Cascades Plywood Co.*, Portland; vice president, EBERLY THOMPSON, vice president *M & M Wood Working Co.*, Portland.

California is Oregon's Best Customer

THE PERCENTAGE of Oregon products consumed in California was recently given in the Oregon Legislature by State Senator Richard Neuberger, in the course of discussion of that hot potato otherwise known as the U. S. Reclamation Bureau's proposal for diversion of Columbia River water to California. He cited the following statistics from the Interstate Commerce Commission:

	%
Box, crate and cooperage materials	73.8
Railroad ties	61.5
Cattle and calves (beef)	56.0
Sheep and goats	60.0
Poultry	40.0
Flour	40.0
Potatoes	46.0
Chemicals	50.0
News print	66.7
Printing paper	76.4
Wrapping paper	59.4
Paper bags	63.6
Other paper products	94.7
Furniture	47.3

Western TRADE WINDS

News about those who distribute and sell industrial equipment and materials

WILSON MEYER, San Francisco, heads up *Wilson Meyer Co.*, newly organized firm for Western states distribution of Eastman industrial chemicals, manufactured by *Tennessee Eastman Co.*, Division of *Eastman Kodak Co.*, Kingsport, Tenn. He is president of *Wilson & Geo. Meyer & Co.*, San Francisco. JEFFERY W. MEYER, vice president of *Wilson & Geo. Meyer & Co.*, is called back into active service as a first lieutenant in the Chemical Corps.

Meyer

Hanson

EDWIN B. HANSON becomes sales manager of *General Electric Company's* San Francisco transformer plant. He succeeds CECIL R. BENSON who is transferred to construction materials department. JOHN D. BILLINGS, Pittsfield, Mass., replaces Hanson as transformer specialist in GE's San Francisco office. HAROLD C. HILL is appointed assistant to manager of General Electric's Industrial Division, apparatus department, Pacific district.

Harry M. Hope Engineering Company, which formerly operated in Boston, New York and Jacksonville, has transferred operations to the Pacific Coast and set up offices in the Lloyd Building in Seattle. JAMES E. LOUTTIT, formery manager of the industrial department of the Seattle Chamber of Commerce, has joined the firm as vice-president. The company specializes in examination, reports, engineering and management of large industrial projects and public utilities.

Pacific Coast district office of *Tinnerman Products* of Cleveland, Ohio, moves to 353½ North LaBrea Avenue, Los Angeles, Calif.

Plant Equipment Co., Denver, Colorado, names JOHN LONDON as general manager. London is a former consulting engineer.

ARCH PATTON, New York consultant specializing in executive compensation and incentive programs, joins *McKinsey & Company* of San Francisco. Patton will continue to headquarter in New York.

MELVIN MAXHAM and JOHN MALLOY are added to sales staff of *Sterling Electric Motors*, Los Angeles headquarters, and JOHN F. INGLE takes over as San Francisco district manager for Sterling.

DoAll Company, Des Plaines, Ill., now offers, through its sales-service stores, an expanded line of machine tools and saw bands, including all types of cutting tools, gages and industrial supplies, as well as abrasives in wheels, bands and hones. A separate selling organization of trained tool specialists will service these lines in all DoAll stores. These products are available to industry on the West Coast through DoAll stores in San Francisco and Los Angeles.

Pacific Airmotive Corporation is appointed exclusive international distributor of *Cee-Bee Chemical Company's* commercial aviation supplies, including a new unit for desealing integral-type aircraft fuel tanks of Zinc Chromate. Thiokol and Buna-type sealants. In order to carry out this new distribution operation PAC will set up required facilities at its Burbank base in addition to its existing Chino facility.

Belilove Company, San Francisco, and *Chester Paul Company*, Glendale, are new West Coast agents for *United States Hoffman Machinery Corporation* of New York.

Cameron

Ira G. Perin Company, San Francisco and Los Angeles, adds ALLAN CAMERON to its sales engineering staff in Southern California.

Ducommun Metals & Supply Company, Los Angeles, establishes a sales office in Phoenix, Arizona, which will act as a clearing house for prompt handling of all orders.

Nelsen

Steinmetz

No stock will be carried. B. G. NELSEN will handle all outside sales contacts for this office, and he will be assisted by W. A. STEINMETZ.

ARTHUR B. KINLEY is assigned post of general machinery division sales manager of *Allis-Chalmers'* Spokane office, where he will specialize in cement, mining and rock product equipment sales. Kinley was formerly application engineer in that company's basic industries machinery department. WAYNE L. SMITH takes over a similar position for Allis-Chalmers in Denver. Smith was recently associated with *Joe Smith Machinery Company*, Denver.

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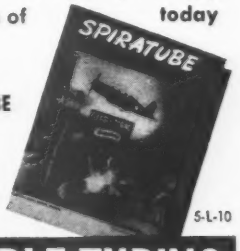

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Following are newly appointed factory representatives for *American Flexible Coupling Co.*, Erie, Pa.; *Shaffer and Nelson*, Seattle, Wash.; *Newton R. Crum*, Long Beach, Calif.; and *Charles A. Fowler Company*, San Francisco, Calif.

REPUBLIC OPENS VENTURA HEADQUARTERS

Pictured above, from left to right are *John J. Pike*, president; *Glenn E. Pitts*, manager of oil fields sales; *Herbert C. White*, Ventura Branch manager, and *Roy W. Johnson*, general sales manager, all officers of Republic Supply Company of California, gathered together for the opening of Republic's new Ventura, California headquarters.

NORTON BOCK is appointed Arizona sales agent for *Ziegler Steel Service*, Los Angeles. Bock's headquarters are at 4015 North 14th Avenue, Phoenix.

New general sales manager for *Calaveras Cement Company*, San Francisco, is MEL J. LONDON.

London

Marshank Sales Co., Los Angeles, now represents *Electro Engineering Products Co.*, Chicago manufacturers of fractional motors, in southern California.

Air Marine Motors, Inc., Seaford, Long Island, N. Y. manufacturer of fractional horsepower motors is represented by *E. V. Roberts & Associates*, 5066 W. Washington Blvd., Los Angeles.

New representative for *Reeves Instrument Corp.*, New York manufacturer of standard instrumentation parts, is GORDON S. MARSHALL, 40 South Los Robles Ave., Pasadena, Calif.

Two *U. S. Rubber Company* veteran sales branch operating managers exchange assignments between two cities: C. F. GOFF replaces H. J. SCHULZE in Los Angeles, while Schulze assumes Goff's duties in Seattle.

Microcast Division of *Austenal Laboratories, Incorporated*, New York and Chicago, appoints *Walter L. Duhig & Company* as Western representative. This organization has offices in Oakland and Los Angeles and its territory is comprised of California, Washington, Oregon, Arizona, Nevada, Idaho and New Mexico.

Western Asbestos Co., San Francisco, is appointed an approved applicator for "Metro Mix" Poured-in-Place Gypsum Roof Decks, manufactured by *Cer-Tainteed Build-*

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San Jose: 460 Park Avenue, CY 3-1317

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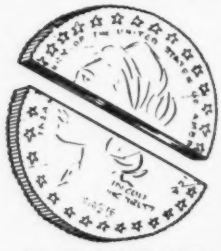

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ing Products Co., Ardmore, Pa., and for a stud welding method of installing corrugated flat asbestos cement roofing, manufactured by *Nelson Stud Welding Div.*, Lorain, Ohio.

ROBERT J. DILLON and GEORGE BINDLEY DAVIDSON, in forming *Dillon Davidson Company* in San Francisco, commence a new type

Davidson

Dillon

of business devoted to redesigning obsolescent products, designing new products and solving marketing problems for existing products. Dillion Davidson is located in the Standard Oil Building.

Sterling Electric Motors, Inc. names JOHN F. INGLE as district manager in charge of new San Francisco office, which serves northern California. Former Sterling Bay Area representative, GEORGE A. HINDLEY, now operates *Hindley Equipment Company*.

J. T. Hill Sales Company, Los Angeles, represents *Vectron, Inc.*, Waltham, Mass., in California and Arizona.

Polarad Electronics Corp., Brooklyn, New York, is now represented by H. A. KITTLESON, 7614 Melrose Ave., Los Angeles.

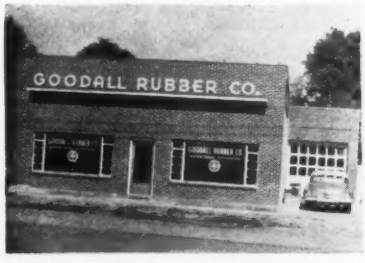
PictSweet Foods, Inc., names ROBERT C. HILL as general sales manager. Hill headquarters in Mt. Vernon, Wash.

DONALD G. MCNABB becomes service engineer for *Independent Pneumatic Tool Co.'s* Arizona territory, headquartered at Phoenix.

George D. Roper Corporation, 2481 Porter Street, Los Angeles, leases a new concrete building located at 4819 East 49th Street.

George Davis, manufacturers' representative, 5127 E. Whittier Blvd., Los Angeles, now handles southern California area for *Kaar Engineering Co.*, Palo Alto.

Goodall Rubber Company's Salt Lake City branch, covering Utah, Montana, Nevada and parts of Wyoming and Texas,



New quarters for Goodall Rubber Co.

moves to new quarters at 631 South 2nd West, Salt Lake. New building provides needed additional space and customer conveniences.

New sales engineer for *General Electric Company's* apparatus department, Industrial Division, Los Angeles, is HAROLD S. DAVIS. Davis previously served G-E as a repair and renewal parts specialist for Industrial Division.

Gerald B. Miller Co., Hollywood, Calif., becomes a representative for *John Fluke Engineering Co.*, Springdale, Connecticut producer of meters and electronic products.

Jacobs Engineering Co., 417 South Hill St., Los Angeles are new sales engineers in Pacific Coast region for *Otto H. York Co.*, East Orange, New Jersey. They will handle all sales and engineering for York's line of wire mesh entrainment separators and mist extractors.

RALPH D. HOLCOMB assumes management of new Pacific Coast Division of *Harnischfeger Corporation* of Milwaukee, Wis. Holcomb will have charge of all operations for P & H on the West Coast, including manufacture of overhead cranes at the new Los Angeles plant.

Holcomb

Barber

The Saran Lined Pipe Co. and *Saran Protective Coating Co.*, through their agent, *Norman S. Wright & Co.* (San Francisco, Los Angeles, Portland and Seattle), appoint HARRY BARBER as special sales representative for Pacific Coast.

Jackson Engineering Co., Los Angeles, is now southern California sales representative for Heat Transfer Division of *The National Radiator Co.*, Johnstown, Pa.

New assistant to vice president in charge of marketing for *Pabco Products, Inc.*, San Francisco, is WILLIAM A. BUCKMAN.

DONALD E. DIBLIN joins the field engineering staff of *Marshank Sales Co.*, Los Angeles electronic representatives. Diblin is a former announcer for station WTNJ, Trenton, N. J.

WALTER BRAENNKEK, assistant to inside sales and service manager at *Western Waxed Paper Co.*, San Leandro, Calif., resigns. He is succeeded by DALLAS HUGHES, formerly of the company's production department.

Creative Metals Company, 1290 Powell Street, Emeryville, Calif., takes over as northern California representative for *Schmitt Steel Company*, Portland, Oregon.

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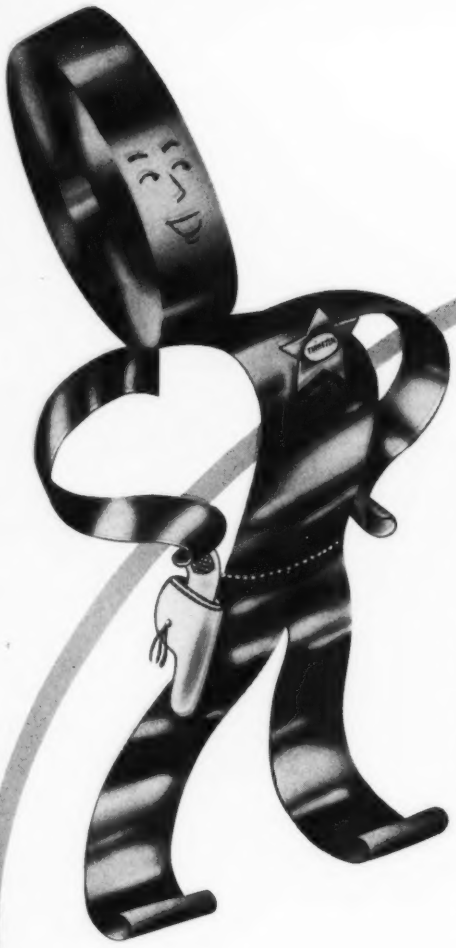

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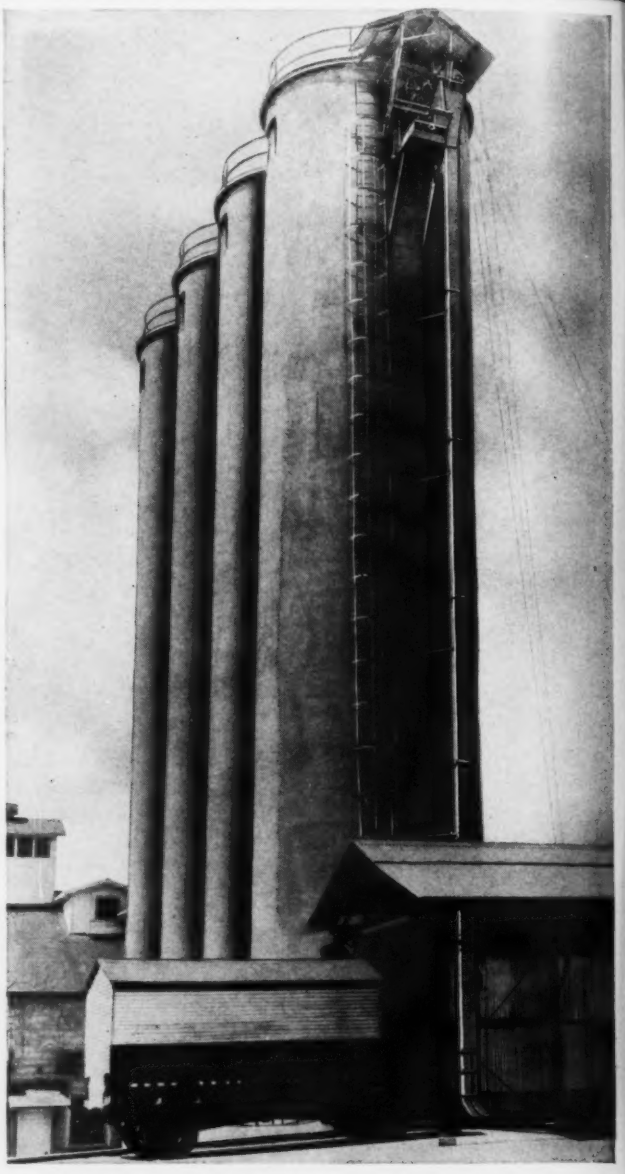

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